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ABSTRACT

A program of science activities for children in the early childhood years and their parents is offered. The three different formats of the Playtime Is Science program are adaptable to a variety of settings and schedules. The Parent/Child Activity Program includes one parents-only session in which participants learn that routine chores involve physical science concepts they can share with their children. During the remaining four sessions, children are given 45 minutes to learn activities. Parents act as facilitators in the activities. In the second version of the program, Parents as Teachers, parents work not only with their own children, but also with their children's classmates. The third version, Super Science Saturday, gives parents a chance to use the program on weekends. The five core activities of the program involve physical science experiences with materials commonly found in the home. Activities include making and using sieves, creating a "mystery bottle," making and tossing bean bags, building with "wonderful junk," and discovering how machines work. Sections of the guide provide directions, a program overview, a resource list of appropriate picture and activity books, and step-by-step activity sheets. (RH)

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Playtime Is Science™

Implementing a Parent/Child Activity Program

Written by
Barbara Sprung
Linda Colón
Merle Froschl
Sandra Jenoure

A program of
EDUCATIONAL EQUITY CONCEPTS INC.
New York, 1990

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Playtime Is Science™

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About this Guide

When I was growing up we always used 'junk' to make games. We didn't have money for toys. I forgot how much more fun it is to make games, than to buy them.

— A parent after attending a Playtime Is Science™ program.

We had parents volunteering to work on this program who'd never volunteered for anything before!

— A parent association president

I learned that I could have fun on Saturday without watching cartoons.

— A ten-year-old after a Playtime Is Science™ Super Science Saturday

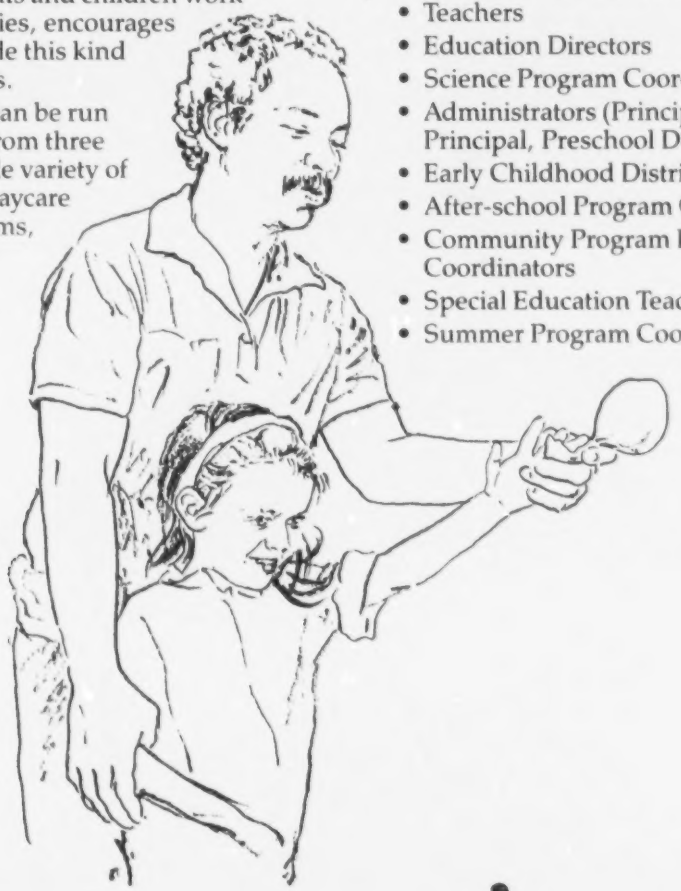
Everywhere it's been tried, Playtime Is Science™ has drawn great reviews from parents, educators, and most importantly—children! The program, which has parents and children work together on science activities, encourages parents to regularly include this kind of play in youngsters' lives.

Playtime Is Science™ can be run for parents and children from three to seven years old in a wide variety of settings: public schools, daycare centers, preschool programs, private schools, after-school programs, community centers, or parent/child education programs. It's the parent/child component of "Beginning Science Equitably," a comprehensive program, developed by Educational Equity Concepts, that also includes an early childhood classroom curriculum.

This Guide makes the Playtime Is Science™ program available for the first time to anyone, anywhere, who wants to implement it. The Guide is based on direct experience with administrators, teachers, parents, and children, over the two-year period when the program was being developed and pilot tested. In here, we've tried to convey both the spirit of the program and the practical information needed to carry it out.

So who can use this Guide? Lots of people!

- Parent Educators
- Parent Involvement Program Coordinators
- Teachers
- Education Directors
- Science Program Coordinators
- Administrators (Principal, Assistant Principal, Preschool Director)
- Early Childhood District Coordinators
- After-school Program Coordinators
- Community Program Directors/ Coordinators
- Special Education Teachers/Directors
- Summer Program Coordinators



The Guide contains five sections. The first four—a program overview; a how-to for training facilitators; a description of the three program versions; and a list of resources—form the main text of the notebook. The Step-by-Step Activity Sheets are included at the end. They are printed on sturdy paper so you can remove them, use them, and copy the parts you need to hand out.

For starters, you should read through the whole Guide and get a full understanding of the program. As you read, bear in mind you'll need to make decisions about implementing the program in your school or center. You'll need to decide...

- which of the three versions of Playtime Is Science™ you should use—or if you might use more than one of them, during the year.
- whether to train co-facilitators to help you run the program—or facilitators who can implement it without you.
- whether to use all of the core science activities, or only some of them. If so, which ones?
- if you should gather resource material for a display, or for your school/program's library?
- whether to prepare a resource list you can pass out to parents.

Answer the questions for yourself—then flip to the relevant sections of the Guide and go over the material there in more depth. If, for instance, you decide to train co-facilitators, you'll need to familiarize yourself with the information in that section. (Even if you don't end up doing a facilitator training, you may find some of the information in that section helpful.) If you decide to go it alone and run a program by yourself, then go through the Step-by-Step Activity Sheets, choose the activities you're going to use, and learn how to do them.

You may choose to follow the instructions given here to the letter—or adapt and improvise according to your own style or the specific needs of your program. The point isn't sticking to a given formula—it's fostering positive feelings about science in parents and children.

One more thing: as you read this Guide, you'll notice a series of boxes sprinkled through it, under the heading "Did you know...?" Each box contains an interesting fact, underlining the importance of good science preparation for all children.

You can use these facts simply for your own information, or you can share them when you're training co-facilitators or working with parents. We've found they're great conversation starters and really set people thinking and talking. But don't take our word for it—see for yourself!

The Big Picture: A Program Overview

In an essay on the state of science in America, Carl Sagan, one of the best-known scientists of our time, warns: "We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology. This is a clear prescription for disaster."[1]

He goes on to add, "Parents should know that their children's livelihoods may depend on how much math and science they know. Now, while the kids are in school, is the time for them to learn."

In the 21st century, all of today's young children—those who choose science careers and those who don't—will need to be informed on crucial matters that concern the environmental, health, and energy future of our country. As Carl Sagan demands in his essay, "How can we decide national policy if we don't know the underlying issues?"

At the same time, the National Science Foundation estimates this country will have nearly a one million-person shortage of trained scientists and technicians by the year 2010.

The reasons are pretty clear, once you take a look at some troubling recent statistics: a 1989 report on the state of education among children today indicates 25 percent of nine-year-olds lack even beginning skills in math and science.[2] On math and science tests recently taken by 13-year-olds around the world, American students ranked last out of six countries tested.[3] A major U.S. electronics company reports that 80 percent of its job applicants can't pass a fifth grade mathematics test.[4]

As we move into the 21st century, it's disturbing to see that scientific illiteracy is still hitting particularly hard among Black and Hispanic groups, and women. In 1988, 16 percent of scientists and engineers were women, 4.5 percent were Black, and 2.7 percent Hispanic. Yet over the next decade an overwhelming 80 percent of those entering the work force will be women or people of color.[5]

The problem of "scientific elitism" has nothing to do with who enjoys doing science and who doesn't: when young girls or children of color have the chance to participate in hands-on science activities, they're very enthusiastic.[6] Often, however, they're not perceived as scientist "material" and don't get the encouragement, guidance, or education that would prepare them for college-level study or technical training.
And so, as it stands now, the technological society remains in the hands of a small, select segment of our population. This must change; as the "motto" of our program says, "Science is for everyone!" We cannot squeeze children of diverse racial and ethnic backgrounds, girls, children with disabilities, or children who are poor out of the pipeline that leads to math and science careers. We do so not only at cost to them, but at cost to ourselves.

Did you know?

In 1988, about 1 out of every 9 people in the total workforce was Black. In that same year, however, only 1 out of 22 scientists or engineers in the workforce was Black. For Hispanics the figures are even lower: although 1 out of 14 workers was Hispanic, just 1 in 37 was a scientist or engineer.

What Playtime Is Science™ Can Do

Playtime Is Science™ is not about facts. It's about a process—one of learning to wonder, learning to question, and learning to think like a scientist in everyday life.

That's why Playtime Is Science™ goes beyond the classroom and teaches parents how to incorporate science, and scientific ways of thought, into their children's daily routines. Using items found in every household—sieves, cooking oil, shampoo bottles, empty boxes, and so forth—the program develops the problem-solving skills, creative-thinking abilities, decision-making powers, and visual-spatial skills crucial for science success in junior high, high school, college, and the working world.

More specifically, Playtime Is Science™...

- helps parents understand the connection between early science learning and later choices in education and careers.
- empowers parents in their role as children's first and most important teachers.
- shows parents they know a lot more about science than they realize.
- gives parents the background and techniques to facilitate independent learning in their children.
- stresses that "Science is for everyone"—not just a privileged few!

Playtime Is Science™ encourages parents to take an active role in their child's education: they can participate in the activities with their children, or even become program facilitators. They can work with other parents planning and running a "Super Science Saturday," or work as "teachers" with groups of their children's classmates.

At home, families can continue and extend the school activities. We encourage parents to create a "science space" somewhere in the house, where children can experiment with combining liquids, building with trashables, or tinkering with mechanical objects. Even more importantly, we show parents how to help children discover science in the everyday world: going to the supermarket, putting away the groceries, walking to school, playing in the park, building a sandcastle, walking the dog.

When you know how to look for it, science is everywhere!

Parents as Teachers

It's so commonplace to refer to parents as "children's first teachers," that we tend to take the idea for granted. But it's a truism that calls for constant thought and action.

We begin teaching children from the moment of birth. We teach them to love, trust, and live as social creatures. We help them learn to play, communicate, walk, and climb. We teach them the alphabet, how to count, to recognize signs, and to identify colors. We teach children attitudes about the world, and their place in it.

If we want our children to be scientifically literate, we have got to include early science learning in their lives: in what we say, the toys and books we buy for them, the activities we do with them. If we want our children to believe science is for everyone, we need to give them everyday opportunities to discover science, and scientific ways of thinking.

"But what do I know about science?" many parents ask. "How can I teach my child about something I don't understand myself?"

Playtime Is Science™ stresses that science discoveries are constantly available to everyone, anywhere. When you walk to the store and notice the different shapes that make up the sidewalk, the windows, the doors, the fences, the cars in the neighborhood—that's science. When you bake a cake, mixing and dissolving ingredients, measuring out substances, turning liquids into solids at high temperatures—that's science. When you put together the coffee maker, turn on the tape player, use an egg beater—more science!

Did you know?
A nationwide test of 13-year-olds revealed that over 25% don't understand mathematics concepts they should already have learned in elementary school.

It's how you look at what's around that can change the ordinary into the extraordinary. Once you stop taking things for granted, and start asking questions—that's science. It's not necessary to be a physicist in order to teach a child how to observe, how to explore, how to solve problems through trial and error—all of which are a fundamental part of the scientific process.

Playtime Is Science™ doesn't ask parents to cram youngsters with information—only to give their children the time and space to question and to wonder.

Take Your Pick: The Three Program Options

There are three different formats of Playtime Is Science,™ making it adaptable to a variety of different settings and schedules. Once you've chosen the version most appropriate for your needs, you can decide whether you'll need to schedule a training session for facilitators or co-facilitators.

The Playtime Is Science™ Parent/Child Activity Program includes five sessions, one an introductory session for parents only and four for parents and their children together. Typically the Parent/Child Activity Program runs weekly during regular school hours.

In the parents-only session, participants learn that routine chores like storing groceries, opening jars, or assembling simple kitchen appliances involve physical science concepts they can share with their children. During the remaining four sessions, children have 45 minutes outside class to do a series of four activities, with parents facilitating.

The program facilitator does the week's activity, with help from parents, before the children arrive; after students are back in their classrooms, parents have time to discuss what went on and to generate a list of skills gained by doing the activity.

The second version of the program, Playtime Is Science™: Parents as Teachers, has parents working not only with their own children, but with their children's classmates. In this option, sessions are usually held every two to three weeks; in between, parents work with small groups of students from their children's classes. This gives more children a chance to do the activities, and often gives parents a confidence boost in their role as teacher to their own children,

"Super Science Saturday," a particularly popular version of Playtime Is Science™, gives parents who are not available during the week a chance to do the program. In one three-and-a-half hour Saturday morning session, parents and children go around the room, working on the different projects at each activity area. Often whole families show up—babies to grandparents—refreshments are served; and a lively, colorful atmosphere pervades the scene.

Hands on: The Core Activities

The five activities in this program—the core activities—create physical science experiences with materials commonly found in the home. Although young children won't understand the abstract scientific concepts behind the activities—and shouldn't be expected to!—their hands-on experiences provide an important basis for later conceptualization and understanding.

Parents working on these activities with children are facilitators—we urge them, as much as possible, to allow children to experiment and discover on their own, while they work.

Following is a brief description of the five core activities. Out of these, you'll choose three or four, for whatever Playtime Is Science™ version you decide to do.

Go with the Flow: Making and Using Sieves

What child doesn't like playing with water? In this activity, water play becomes a chance for children to observe physical properties of this liquid—the way it splashes and flows, how it sounds, how it looks, how it takes the shape of whatever container it's in. Children use nails to poke holes in foil or plastic containers or plates, to create sieves.

Then they have time to play with their sieves in basins full of water. For an extra added attraction, they can put food coloring in the water, and watch the way the two liquids blend together.

Creating a Mystery Bottle

We all know that oil and water don't mix, but children doing this activity may be discovering that fact for the first time.

Mystery bottles are a fascinating concoction of vegetable oil, water, and food coloring in clear plastic bottles. When the liquids are poured into the bottle, they form a colorful combination of layers, with tinted water—red, blue, yellow, or any other color—on the bottom, and the clear oil on top.

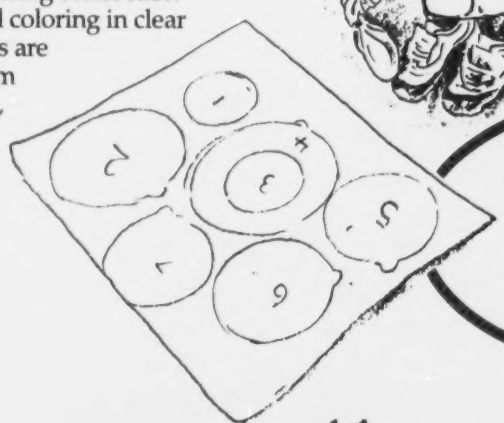
Children first see a bottle the facilitator has prepared, then have a chance to make their own. As they play with their bottles—shake them, roll them, turn them upside down—they'll find that no matter what they do, the liquids inside the bottle will eventually separate: the colored water on the bottom, the clear oil on top.

Children see that some liquids can't mix, and that oil is lighter than water and will always rise above it.

In My Estimation: Making and Tossing Bean Bags

When was the last time you saw bean bags for sale in a toy store? Playtime Is Science™ revives a traditional childhood game that's been neglected of late—children today can have as much fun with bean bags as we did, growing up.

Bean bags aren't only fun—they're an excellent way to help children develop their visual-spatial and estimation skills. In this activity, children make their own bean bags out of socks, rubber bands and, of course, beans—different sizes, colors, and shapes. Then children draw their own targets, being as creative as they want, and practice tossing the bean bags at them.



Did you know?

In 1989, of the 1,573 members of the prestigious Academy of Science, 57 (3.6%) were women. Although the Academy dates back to the 19th Century, all but three of those women were elected in the last 44 years.

Building with Wonderful Junk

Building activities are an essential part of early childhood curriculums—and one of the things children like to do most. Construction games can develop crucial physical, cognitive, and social skills; and "Building with Wonderful Junk" shows parents you don't need expensive blocks or kits to enjoy the fun of building. Using trashables like cardboard cartons, cereal boxes, paper towel rollers, empty milk containers, and other found materials, children work together to create a structure that's as tall as it can be, while still standing on its own.

Discovering How it Works

This activity gives youngsters a chance to explore the inside workings of safe, simple machines like plant misters, food grinders, or juice extractors. With a facilitator watching, pairs or small groups of children assemble the machines, getting as much "tinkering time" as they need to explore and learn all about the working parts. Children also have a chance to work with a hand drill and screw driver, attaching hinges to pieces of scrap wood.

Did you know?

In 1989, the average salary offer to a student with a bachelor's degree in aerospace engineering was $29,424. The average offer to a student with a degree in English was $20,348.

Variations on a Theme

The core activities we've described here can be modified or extended, should you want to run more than one Playtime Is Science™ program during the year, or to extend the parent/child activity program. For instance, you can experiment with putting different liquids in the bottles or dropping small objects into bottles containing different liquids. You'll find ideas for variations at the end of each activity.

And while we're on this topic, remember that in general, there's plenty of room within the context of Playtime Is Science™ for improvisations. If a "Super Science Tuesday" suits you better than a "Super Science Saturday," fine. If there's something a little different you want to try when you're training facilitators, go ahead. We believe in independence and experimentation through trial and error, as much for adults as we do for children!

Footnotes

Did you know?

Material for "Did you know...?" comes from the Bureau of Labor Statistics; the Educational Testing Service; the National Academy of Science; the National Education Association; the National Urban Coalition; and the U.S. Census Bureau.

The Big Picture: A Program Overview

1 From "Why We Need to Understand Science" by Carl Sagan. *Parade Magazine*, September 10, 1989. Page 6.

2 From the report "Crossroads in American Education," by the Educational Testing Service. Issued February 1989.

3 Survey done by the Educational Testing Service, released January 1989.

4 From "Why We Need to Understand Science" by Carl Sagan.

5 Bureau of Labor Statistics.

6 Jane Butler Kahle, as reported in "A Damning Set of Data: Subtle Differential Treatment of Girls and Blacks," *Education Week*, July 27, 1983.

With a Little Help: Training Facilitators

"Fun, fun, fun!" one teacher wrote on her evaluation form, after attending a Playtime Is Science™ facilitator training session. And it's true—the training process outlined here is both thought-provoking and enjoyable. You'll find the hands-on learning activities it demonstrates aren't age-specific—adults get just as enthusiastic over making mystery bottles or building with junk as the children do.

It's likely you'll need to run a training session whichever version or versions of this program you choose to work with. You may need to train co-facilitators to help you with the parent/child activities, or facilitators to implement the program in their own schools or daycare centers. Examples of people who'll want to consider doing a training are:

- Daycare directors, education directors, and other school administrators offering the parent/child activity sessions during school hours may want to train a family worker, a resource room coordinator, and/or a parent as a facilitator.
- A teacher may want to train one or more parents to work on the activities with small groups of children.
- A parent planning a "Super Science Saturday" will need to train eight facilitators (two for each activity), plus a crew to help with setting up, registration, and similar chores.
- A district coordinator (science, or early childhood, for example) might train a large group of facilitators to launch the program in many schools simultaneously.

Depending on how large the group is and which version or versions of the program you'll be using, training can take anywhere from two hours to a full day. A group of parents doing a Super Science Saturday, for example, will probably need two hours to start, plus some follow-up meetings to work out event logistics. To teach facilitators from a single school how to do one of the multi-session versions of the program could take a full morning. Training facilitators from several schools or a whole district might take all day.

There are three parts to a typical training session, each of which is described in this section: A warm-up, doing the activities, and wrapping up. Keep these golden rules in mind as you run the training.

- Make sure participants realize how important early science education is in opening up college and career opportunities for children.
- Make sure they understand why children need hands-on science play in their lives on an ongoing basis.
- Be sure participants themselves get hands-on experience with the science activities! Some probably won't have done anything like this before, and may not realize the value of this learning method.

Be clear as to what Playtime Is Science™ is about and strive to create an atmosphere that really says, "Science is for everyone." Participants should leave motivated to encourage early science skills, and positive attitudes about science, in children. Often, you'll find it's most effective to go over the goals of the program after you've gotten participants talking and thinking with one of the warm-up exercises.

Some people who take the training will find they haven't thought before about the issues it presents. It may be the first time they really make the connection about how childhood experience shapes adult life. It could be the first time they discover that other people—yes, even the trainers—have anxieties about science. The chance to express feelings about this, in a supportive, nonjudgmental atmosphere can be liberating.

As one educator who's run the training sessions puts it, "There's such a bonding that goes on—you think you're all alone not liking science, then you find out other people feel the way you do. You're not on the line, you're free to express how you feel—and you get lots of positive feedback!

Doing the hands-on activities in an experimental setting, with no "right" or "wrong" answers, seeing science brought down from the realm of genius to the level of the everyday, is also empowering for participants. As they tinker with simple machines, or construct a five or six foot tower with "found" materials, they begin to realize life experience has already taught them more about science than they ever realized. It's an exciting discovery.

Did you know?

Women are over 51% of the population—but only 7.3% of the engineering workforce. The two most popular engineering specialties among women are industrial engineering, and then chemical engineering.

The Warm-Ups: Getting to Know You

Warm-up exercises can be an effective, interesting way to help your trainees understand the need for early science education. They're a good way to break the ice in the group, as well. Look over the descriptions below and decide which will work best for you.

First Encounters of the Science Kind: Early Experiences with Science

(Time: 10-20 minutes)

Have participants introduce themselves and talk about their earliest brush with science, at home or in school. Lead a discussion based on what they say, remembering to stress key points of the Playtime Is Science™ program.

Accentuate the positive! If people talk about frustrating or unfortunate experiences with science—and they probably will—emphasize the importance of handling things differently for our children. At the same time, you should be sympathetic to the negative messages many of today's adults received about science when they were young. Parents who continue to be intimidated by science will have a harder time encouraging their children's interest in it.

Following are some simple participant/trainer dialogues, as guidelines.

Back When I Was in School...

Participant: Early science education? They didn't have anything like that when I was a kid. I don't remember being taught any science at all in elementary school.

Trainer: So the problem we're talking about today—lack of science teaching for younger students—isn't a new one. What we have to do now is turn things around for the children of the 21st century.

P: I don't remember anything about high school science, except that it put me to sleep! All we did was read a long, boring textbook and watch the teacher demonstrate experiments to the class.

T: That's why this program stresses hands-on experience for children...and parents. You'll see for yourself what a difference it makes. Science really can be fun.

P: Dissecting frogs—yuck! When I had to do that in 8th grade biology class, it seemed too much like killing to me.

T: That kind of experience has turned lots of people off to science for good. But science is about a lot more than dissecting animals—there aren't any frogs in this program!

A Scientist Is...

P: In my school, only nerds liked science. I didn't want to be a nerd, so I got by learning as little about science as I could.

T: Lots of us think about science that way. That's one stereotype that's got to go if we want to expand the pool of people going into science.

P: "Girls don't need to bother with advanced math or science classes." That's what my guidance counselor told me when I said I wanted to take this one math class. So I took Home Ec. instead.

T: Maybe a "supergirl" could have gotten past that message, but for most of us...no way. The stereotype about girls and science has been around for too long. We should encourage our daughters' interest in science, not discourage it. Then we'll have more women scientists as role models.

P: The pictures in my science book showed white men in white coats. That's who I thought scientists were. People like me didn't become scientists.

T: It's a vicious circle. If children don't see different kinds of people working in science, they don't realize scientists can come from all kinds of backgrounds. And if all kinds of children don't go on to be scientists, then scientists will continue to be white men. We need to break out of the circle!

Science Phobia: It Can Be Catching!

P: When it comes to science, I guess I'm afraid of it. I don't know anything about it, so how can I teach it to my children?

T: You're not alone! Lots of people feel that way. But as this program will show you—you know more science than you think. There are plenty of things we can teach children about science, based on everyday life experiences. You don't have to be a scientist to help your child start thinking like one!

Stereotype-Busting: Who Is a Scientist?

(Time: 10 - 20 minutes)

After group members introduce themselves, tell them you'd like to hear their personal ideas on how a scientist looks. In the discussion that follows, typically you'll hear references to an elderly, white man, with wild, fly-away hair, who wears a white lab coat and glasses—sort of a cross between Albert Einstein and a mad scientist from the movies.

Ask group members to think about where this stereotyped image comes from. What does it say to children who are not white, or male? Talk about the need for broadening children's role models of scientists. How can we accomplish this?

Suggest some ideas: for instance, taking children to places where scientists of all backgrounds are at work; hanging up pictures or finding picture books of scientists from different backgrounds; talking with youngsters, or guiding them to books about scientists who aren't white or male, or who may have physical disabilities. (Some potential role models: Marie Curie, discoverer of radium; Jewel Plummer Cobb, a Black, female cell physiologist; Elma Gonzalez, a biologist; British physicist Stephen Hawking who uses a wheelchair).

Worth a Thousand Words: The "Science Is for Everyone" Collage

(Time: 30 - 45 minutes)

Using this warm-up as an opener for the training session works well. It keeps first-comers occupied, and it is a simple (and fun) way to let participants in on the message that "science is for everyone." You'll need to do the following to get ready:

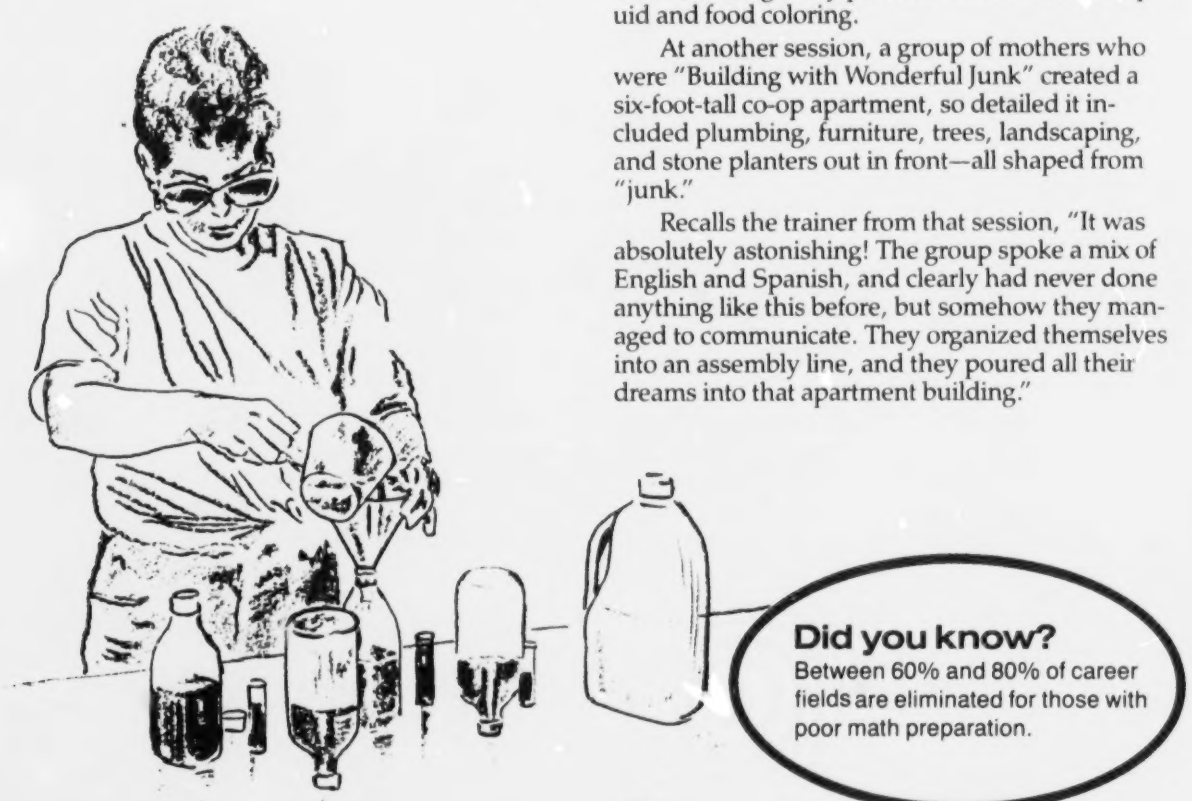
1. Make a sign that asks people to contribute to the collage as they gather for the training, and during breaks.
2. Have a variety of pictures that you have cut from magazines—*National Geographic, Science, Science and Children,* and popular magazines such as *Time, Newsweek, Good Housekeeping*. Be sure to supplement these with pictures of scientists who are disabled (a good source is *Able Scientists-Disabled Persons: Careers in the Sciences,* by S. Phyllis Stearner, Ph.D, which is available from Foundation for Science and the Handicapped, Inc., 154 Juliet Court, Clarendon Hills, IL 60514, Phone: (312) 323-4181).
3. Set out a piece of foam core or oaktag, about 20"x30", on a table.
4. Provide liquid glue, scissors, the cut pictures, and some magazines, in case people want to cut out letters, words, or pictures of their own.
5. Paste a sample picture or two on the board, and cut out a couple of words—"Discover," "Future"—to give people the idea.
6. At the end of the session, discuss how a collage like this can contribute to the "science is for everyone" environment.

Hands-on: Learning by Doing

It's not just children who learn best this way. And because science is very much a hands-on discipline, the major portion of the training should be devoted to doing the activities themselves. You'll probably find your trainees taking full advantage of the chance to be loose and creative. A typical example is the mom who initially had to be coaxed into attending a session, but became so excited over the mystery bottles that she made nine of them, using every possible combination of liquid and food coloring.

At another session, a group of mothers who were "Building with Wonderful Junk" created a six-foot-tall co-op apartment, so detailed it included plumbing, furniture, trees, landscaping, and stone planters out in front—all shaped from "junk."

Recalls the trainer from that session, "It was absolutely astonishing! The group spoke a mix of English and Spanish, and clearly had never done anything like this before, but somehow they managed to communicate. They organized themselves into an assembly line, and they poured all their dreams into that apartment building."



Did you know?
Between 60% and 80% of career fields are eliminated for those with poor math preparation.

Since you can't teach what you don't know, the first step in this portion of the training is doing the activities yourself. You'll find complete instructions in the Step-by-Step Activity Sheets at the back of this Guide. Once you're confident about demonstrating them, set up the ones you want to do—preferably at least three activities. Participants can work on them in three separate groups, each group doing a different project; or you can just let people move around the room and try whichever activities interest them.

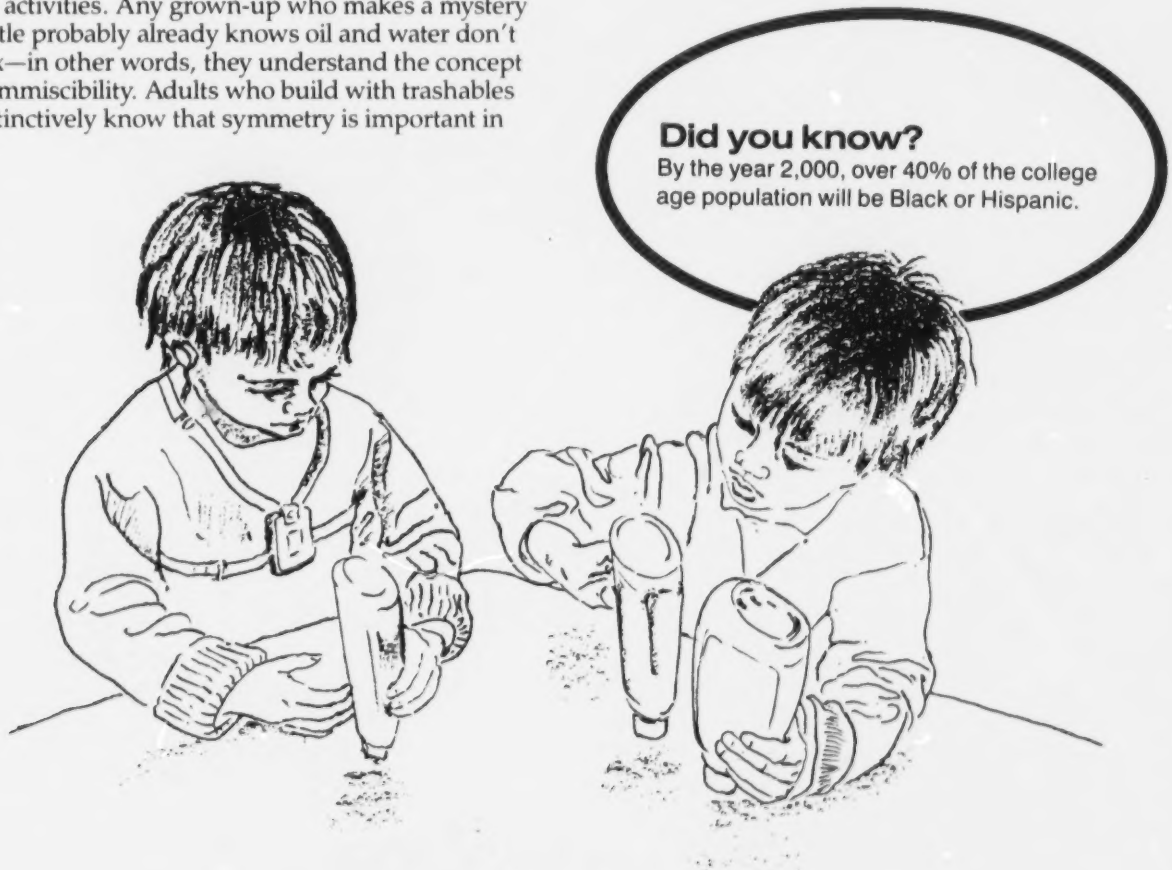
As you guide participants through an activity, be sure that you're modeling how to facilitate it, rather than how to direct it. The whole process should be one of discovery. Ask problem-solving or decision-making questions. If you're "Building with Wonderful Junk": "How can we make this building stronger?"; "Which shapes work best at the base of the tower?" For "Creating a Mystery Bottle": "What happens when you shake the bottle? When you let it rest quietly for a few minutes?"

And so forth. Look at the scientific background information included with the different activities, if you want ideas for appropriate questions to ask.

Point out to participants how much scientific knowledge they're demonstrating simply by doing the activities. Any grown-up who makes a mystery bottle probably already knows oil and water don't mix—in other words, they understand the concept of immiscibility. Adults who build with trashables instinctively know that symmetry is important in creating stability: again, probably without realizing it, they've grasped a principle of balance.

You should also model group management skills as you go along. Make sure you've set the room up ahead of time, and have extra materials on hand: some spare empty bottles, or extra socks for making bean bags. Paper towels and sponges should be ready and waiting. If someone has a sudden water or oil spill—don't panic. Just show the person the towels or sponges, and let them take care of the clean-up themselves.

After completing each activity, take plenty of time to come up with a list of skills the participants have gained—you can consult the sample skills lists included at the end of the "It's Up to You" section, for an idea of what skills each activity promotes. There'll be lots of chances here to link a sense of enjoyment and discovery regarding the activities to positive attitudes toward, and early learning in science.



Wrapping It Up: Summary and Planning Time

You'll need about ten minutes to summarize the session. Briefly review the key points brought out, and answer questions participants have. Budget planning time in, as well: this portion of the training can be called "Now It's Your Turn." Participants should use the time to decide which version of the program is most appropriate for their own schools or centers, and how they'll go about implementing it.

Again, how much planning time is needed depends on the number of facilitators involved and which version of the program you're running. Parents planning a Super Science Saturday™ might need 15 or 20 minutes to assign tasks and schedule any other meetings. The administrator with the district-wide program may need to give facilitators an hour for working out plans and schedules.

With your facilitators or co-facilitators set to go, so is the Playtime Is Science™ program. We think you're going to be pleased by the results!

It's Up to You: Three Versions of Playtime Is Science™

Did you know?
Currently, 20% of all physicians are women. That percentage is expected to remain pretty stable through the year 2000. (3.3% of all medical doctors are Black.)

We want as many children as possible to experience Playtime Is Science™. The three versions of the program—all successfully pilot-tested—make it adaptable to a variety of different situations.

For instance, the second version of the program, "Parents as Teachers," gives more children a chance to participate in Playtime Is Science™ than the first version does, while directly involving parents in the educational process. "Super Science Saturday," the third option, gives family members who work outside the home a chance to interact with their children, since it's not held during regular school hours.

The instructions that follow are meant to make running a Playtime Is Science™ program as painless as possible! We call them our "1-2-3 Guides": they'll take you step by step through whichever program version you decide to use, reminding you of what to do when, as you prepare for and conduct each activity session. The Guide pages for each version are arranged so they can be easily copied, and you can refer to them conveniently as you work.

A word of reassurance: lots of times, facilitators are nervous about not knowing the answer to science questions parents or children ask while they're doing the activities. *There's nothing wrong with saying you don't know the answer!* Remember that this program isn't about facts—it's about getting a thinking process started. If someone wants information you don't have, it's perfectly O.K. to say something like, "How could we find out the answer to that question? I bet if we looked it up in the encyclopedia, we could get some information."

And don't forget the "Conceptual Backgrounds" and "Glossaries" included on the Activity Sheets.

Good luck, and enjoy!

You Must Remember This...

Before you implement Playtime Is Science™, you'll need the approval of appropriate officials or administrators, and commitments from teachers or other people—the school social worker, the parents room coordinator—who'll be helping you get word of the program out to parents. If you can, get the parents association to help you: they can contact parents, find out who might want to be a facilitator, allot funds for supplies, etc.

If you're doing the parent/child activity program, be sure your proposed schedule is in synch with teachers' plans, since they'll need to release children from classes to do the activities. Once you've come up with a schedule for the program, you obviously don't want to find it conflicts with a field trip, test, etc. If you're doing a "Super Science Saturday," be aware of religious holidays, long weekends, and school events.

One thing that usually works well is to designate an appropriate person—teacher, parent, assistant principal, etc.—as a liaison between the program and other teachers, the administration, and participants. You'll also need to decide whether to train facilitators or co-facilitators, and to schedule a training session if necessary.

Once you're actually running the sessions, remember as you work with children on the activities, to encourage cooperation among group members, and to make sure everyone participates. Check to be sure participants understand what they're supposed to be doing. Keep circulating, so you have a feel for what's going on in the room.

Also remember: encourage children to talk as they work. You'll help them work on their social and verbal skills along with their science skills. Stress decision-making, problem-solving and creativity; and last but by no means least—be sure everyone's having fun!

A Word About $$$

The costs involved in running Playtime Is Science™ aren't hefty, and if you're resourceful, there are lots of ways to gather supplies without dipping deeply into any pockets. At the very least you may need to allocate money for bottles of vegetable oil and bags of dried beans, for "Mystery Bottles" and "Bean Bags"—on the other hand, if you have lots of participants to supply, you could ask each one to bring a bag of dried beans, and a bottle of vegetable oil when you're doing those activities.

If you need to raise funds, you could ask the parents association, or go through your school or center's special program budget. In the end, much of how you go about gathering supplies will come down to whether it's more essential for you to conserve time, or money.

If you take time to ask around, often you'll find you can line up lots of the materials: one facilitator seeking food grinders for "Discovering How it Works," put the word out in her neighborhood and quickly found herself with three! Ask the parents association to help you locate materials—food coloring, socks, trashables, simple appliances, or whatever else you need. Some local merchants might be willing to donate supplies. Ingenuity will go far, if you have time to use it!

Version 1:
The Playtime Is Science™ Parent/Child Activity Program

The first session of this version—called "Parents Are Problem-Solvers"—is for parents only. Participants will discover the pleasures of scientific curiosity, as they explore the principles behind ordinary household tasks like opening vacuum-sealed jars, using a hand-operated foodgrinder, or storing rice and beans. Then they'll team up with their children for the following four sessions, to make mystery bottles, build with "junk," or do any four of the five core activities.

After each session is over, parents and facilitator, together, will come up with a list of skills gained from the activity. The lists will be taped up on the wall so participants can see how much they've learned. Sample skills lists are at the end of this section.

Sessions in this version last about 90 minutes. Only children whose parents are attending can participate.

The Parent/Child Activity Program 1-2-3 Guide

Planning

You will need to start planning about six weeks before the start of the course. The first thing to do is to get official approval for the program and meet with the Parent's Association, if it is involved. Write your letters or flyers to parents and arrange to get them copied. We have provided sample letters in English and Spanish, but you may need translations into French, Chinese, Vietnamese, Arabic, or other languages. Also, since you will need to schedule the room where the program will be held for several weeks at the same time of day, make arrangements well in advance. Finally, it is a good idea to begin collecting bottles before the other materials, since it takes a while to gather a critical mass of small, clear plastic water or soda bottles.

Countdown

Three Weeks to Go:

- Talk to teachers about the program; make sure there's no conflict of schedules. Be sure teachers realize that only children whose parents attend Playtime Is Science™ can participate in the activities.
- Finalize dates and space for the program. A large room, with access to running water, and work tables, is ideal.
- R.S.V.P.s: Send a letter to parents, telling them about the program and asking them to attend. Emphasize that they need to preregister, so you'll know how much to collect in the way of materials. (For letter-writing inspiration, see sample letter in English and Spanish at the end of this section).
- Recruit your facilitator(s), if needed, and gather training materials. Hold a training session; again, preferably in a large room with running water.

Two Weeks to Go:

- Collect your pre-registration forms—use "kidmail" and have children bring them back in to class. If necessary, teachers should ask children to remind their parents to return forms.
- Get it together: start to gather the materials you'll need, especially for the first couple of sessions. (You'll find a list of materials needed for each session in the Step-by-Step Activity Sheets included with this Guide.)

One Week to Go:

- Make sure all materials for "Parents Are Problem-Solvers" are assembled.
- Last reminder to the absentminded: send a notice home with children to remind parents of the time/place/date of the first session.

Doing It

Before a session, have all the materials for the activity you'll be doing ready to go. You'll need some pieces of newsprint, a thick marker, and masking tape for each session, so you can make the skills list and tape it to the wall.

Session One: "Parents Are Problem Solvers"

Working with the Large Group (15 minutes)

1. Who's: have parents introduce themselves and tell the group their child's name and age.
2. Why's, what's, how's: overview of the goals and methods of the Playtime Is Science™ program.
3. Breakdown: split the large group into three small ones. Put each group at a separate table.

Small Groups (20 minutes)

1. Give each group its different materials, and a task card. You'll find these cards, in both English and Spanish, included with the Activity Sheets.
2. Getting to work: a group member should read the task card aloud, and group members should start the task. Someone should act as recorder/reporter at each table, taking notes on what happens.
3. Give groups a warning, about five minutes before time's up.
4. Reassemble the big group.

Large Group (45 minutes)

1. Debrief: ask the group's reporter to read the task card aloud, and talk about what the group did. What did group members find out from doing the task? The group can demonstrate its activity, while you encourage discussion about it. (Questions to prompt discussion are included on the Step-by-Step Activity Sheets for this session.)
2. Tape three large sheets of newsprint paper up on the wall, in a central location. As you discuss what each group did, use the markers to create a skills list based on the specific activity. The longer the list, the better!
3. Talk with parents about how children can benefit from using familiar, everyday materials—as parents just did—in hands-on, learning activities.

Wrap-Up (10 minutes)

1. Sum up the session. High points to hit: brief overview of the program goals; how parents have more science knowledge than they realized; how everyday experience can promote science learning—refer back to the skills lists you just made. Stress to parents how important their role is as teachers in their children's lives. Emphasize that science is as much about asking the right questions as knowing the right answers!
2. Preview of coming attractions: discuss what will happen next session.
3. Make sure parents know the date and time that session will take place, as well as what materials they should bring.

Did you know?
In 1988, 29.5% of all computer scientists and systems analysts were women. But a whopping 88.2% of data keyers—the people who simply input data on the computer keyboard—are women.

Sessions Two through Five: The Parent/Child Activities

Large group (15 minutes)

1. Welcome everyone; let them know what will be going on during this session.
2. Demonstrate whichever activity you're featuring that day, role-playing as you go. Some of the parents can help you as you do the activity: you facilitate and they'll take youngster's roles. Remind parents to let children work as independently as possible, when they do the activities together.
3. Bring in the children: depending on the arrangements, parents will pick them up from classrooms, or a teacher/aide will bring them to your room.
4. Break everyone up into small groups. From two to four parent/child pairs can work around one table—depending on how big the table is—and share materials. Parents will be facilitating their own child's, or children's, work.

Small Group (30-40 minutes)

1. It's a team effort: parents and children work together on the activity.
2. Children finish up and are returned to the classroom.

Large Group (20 minutes)

1. Talk over what went on during the activities and share reactions; answer any questions parents have.
2. Together, parents generate a list of skills the children learned that day. Tape the lists up on the wall for everyone to see.

Wrap-Up (10 minutes)

1. Briefly summarize the whole session, as you did in the "Parents Are Problem Solvers" Wrap-Up.
2. Preview coming attractions: remind parents of when the next session is; go over what will be happening and what materials parents need to bring.
3. At the end of the entire program, it's a good idea to invite parents back for a short summary session—a 30 to 45 minute meeting where they can share experiences. Provide some refreshments and make it a pleasant occasion. Keep your ears open: some parents may have come up with working techniques you'll want to use next time you run the program!

Version 2:
The Playtime Is Science™ Parents as Teachers Program

The "Parents as Teachers" program option was developed at the suggestion of a principal, in Brooklyn, New York, who told us she likes to see parents participate at school, in the classroom as well as in more traditional roles. This version is especially useful for the Parent Involvement Programs, now in place at schools across the country.

This version uses the same format as the previous one—with a major difference. Parents work on the activities not only with their own children, but with their children's classmates, as well. The time between parent/child sessions is lengthened to two or three weeks, and during that period, parents facilitate the activities with small groups of their children's classmates. This gives children whose parents can't attend with them, a chance to do Playtime Is Science™; and it's often empowering for children whose parents do participate to see them at work as teachers.

The Parents as Teachers 1-2-3 Guide

Planning

Since this version takes 8 to 10 weeks to complete, try to begin it as close to the start of a school term as possible. Our suggestion: do a facilitator training in the fall, then begin the program in January. That way, the holidays won't interrupt, and you can allow extra time between sessions if you have lots of students to fit in.

Teachers will need to be actively involved in the planning and scheduling process of this program, since they'll be letting children out of class in small groups to do the activities. As we've suggested earlier, it's a good idea to have a liaison between the program and teachers.

If you're going to be training co-facilitators, invite teachers along, so they'll be familiar with what you'll be doing. If you're not going to train facilitators, hold a teacher orientation session to explain "Playtime Is Science."™ Be sure to demonstrate one or two of the hands-on activities.

Countdown

Eight Weeks to Go

- Get official approval for the program. Meet with the parents association: they may be able to help you find parents who'll want to do the small group work. Let teachers know your plans; check for scheduling conflicts.
- Set dates and decide where the program will take place. (A large room with easy access to water is your best bet.)
- Sign 'em up: recruit your co-faciliators. Schedule your facilitator training or teacher orientation and decide where it will take place. (Again, a large room and a ready water supply are ideal.)

Four Weeks to Go

- Meet with teachers or a teacher liaison to work out a schedule and logistics for the small group work with children. Will you be doing the group work in classrooms, or elsewhere?
- Choose your activities: decide how many and which you'll be using. You may want to use all of them, or you may decide an introductory session for parents, and two or three parent/child activities are enough.
- Start assembling materials, based on the Activity Sheets, for the training session and the program. Ask the parents association for help, if you want.

Three Weeks to Go

- R.S.V.P.'s: send out letters to parents, explaining the program and asking them to attend. Tell parents you need them to preregister, so you know how many will be working with the small groups, and how much in the way of materials you'll need.

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Two Weeks to Go

- Collect the pre-registration forms.
- Train your co-facilitators, or hold the teacher orientation.
- Finalize the schedule and the place where you'll do the small group work.

One Week to Go

- All your materials should be assembled.
- Don't forget: Send a notice home with children to remind parents of the time/date/place of the first session.

Doing It

You can begin this version two ways. You can start with a "Parents Are Problem Solvers" session or you can go right to the first parent/child activity. Starting with the "Parents Are Problem Solvers" session will give you ample chance to explain to parents what their role as teachers will be.

But if you need to save a week in the schedule, skip right to the first parent/child activity session. If you go this route, be sure to work an explanation of parents' teaching role into your opening talk. Look at the "Session One" instructions below, and read over the session outline for "Parents Are Problem Solvers" in the first version, so you can incorporate relevant parts into your introduction. Leave time at the end of the session for questions and scheduling.

As with the first version of Playtime Is Science™, have all the materials needed for the activity you'll be doing ready to go, before each session starts. Again, you'll need some large pieces of paper, a thick marker, and masking tape for each session, so you can come up with a skills list to tape to the wall.

Session One: Parents Are Problem Solvers (Optional)

If you're including this session in the program, refer to the information under the same heading in version #1: The "Parent/Child Activity Program."

Of course, you'll also be talking with parents about the small group work they'll be doing in between sessions: keep in mind that sometimes people get nervous about working with groups. Reassure them that the idea is the same as working on the activity alone with their own child.

They should give the children lots of independence, and facilitate rather than direct. They should encourage a cooperative atmosphere, in which youngsters work together and help each other; they should *not* encourage competition, and they should validate what *each* child is doing.

The "Parents Are Problem Solvers" session should last about 90 minutes.

Sessions Two, Three, Four, and Five

Large Group (15-20 minutes)

1. Welcome everyone; let them know what will be happening during the session. If parents have done the small group work in between this session and the last, allow ten minutes for feedback, questions, problems.
2. Demonstrate whichever activity you're featuring that day, having a couple of the parents help you out. Role-play: you facilitate, while parents act as children. Remind parents to let children work as independently as possible, when they do the activities together.
3. Depending on arrangements, parents will either pick children up from classrooms, or a teacher/aide will bring them to your room.
4. Break everyone up into small groups. Two to four parent/child pairs can work around one table—depending on how big the table is—and share materials. Parents will be facilitating their own child's, or children's work.

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Small Group (30-40 minutes)

1. Dynamic duos: parents and children work on the day's activity together.
2. Children finish up and are returned by their parents to their classroom.

Large Group (15 minutes)

1. Talk over what went on during the activities and share reactions; answer any questions parents have.
2. Together, parents generate a list of skills that children learned. Tape it up on the wall for everyone to see.

Questions and Scheduling (15 minutes)

1. Answer any questions parents may have.
2. Schedule the small group work. It's useful for the teacher liaison to be in on this part of the session.
3. Be sure parents know how to get hold of you and co-facilitators. You should plan on attending at least a few of the small group sessions with children, so you can give assistance, support, whatever, to parents.

A Word on the Small Group Sessions with Children

Parents will be working with three or four children at a time, until every child in class has had a chance to do the activities. Our experience has been that it takes about two weeks to do this, but there are different ways to schedule these sessions. You decide what will work best in your situation. For instance, you might want to do several sessions a day and wrap all of the small group work up quickly.

As with the first version of this program, it's a good idea to invite parents back for a short summary session—a 30 to 45 minute meeting where they can share experience. Provide refreshments; make it a pleasant occasion; and keep your ears open for helpful tips parents may have come up with. You may be able to use them next time you run the program!

Did you know?

Out of the total number of U.S. geologists—scientists who study rocks, and the earth—.8% are Black and 2% are Hispanic. Out of all chemists, 4.1% are Black, and 2% are Hispanic.

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Version 3:
Playtime Is Science™:
Super Science Saturday

Everybody enjoys "Super Science Saturday!" At one school that held this event in spring, some 120 people showed up, enjoyed themselves, then spread the word around. When the school ran a "Super Science Saturday" again the next fall, 250 people showed up—almost more than program planners were ready to handle!

There's a good deal of work involved in putting this program version together, but we think the end result is well worth it. It's a three-and-a-half-hour mini-marathon of science activities, held in a lively and colorful atmosphere. Balloons and signs hang throughout the room; there are things to see, touch, and smell, to take apart, put together, and build with.

Participants are asked to "pay" to get into "Super Science Saturday": old socks; empty small plastic bottles; and trash—egg cartons, cereal boxes, paper towel rollers—are the fee. Refreshments are provided, and whole families—moms, dads, brothers, sisters, even grandparents—often come together.

There's an obvious advantage to offering the program on Saturday: family members who work outside the home get a chance to do the program. Once they've checked in at the door, parents and children go to an activity area and work on the activity for 30 minutes. (Facilitators at each station introduce the project and monitor parents and children as they work.) Then, families rotate clockwise to the next area, and start something new—by the end of the event, everyone's had a chance to work on each activity.

Super Science Saturday 1-2-3 Guide

Planning

When you start preparations for a "Super Science Saturday," don't forget to get the cooperation of one particularly crucial person—the building custodian will need to know what's going on and will need to be paid since the event is outside of regular school hours.

Next, you'll want a working committee to handle planning and logistics of the event—often, the parents association takes care of this. You'll also need eight facilitators—two per activity—and two people to handle registration.

You can choose to do any four of the activities—or only three, if you think that will work better. When you choose the activities, keep in mind it's a good idea to balance them so children end up with something to take home; or, preferably two somethings—a mystery bottle and bean bag, for instance.

"Super Science Saturday" needs to be held somewhere that gives you lots of space—a lunchroom, or gym, for example. You're also going to need lots of supplies. Consider whether you want to set a limit on the total number who can attend.

Countdown

Eight Weeks to Go

- Get the necessary approval from officials and administrators; start deciding on a date. Remember to consider religious holidays, long weekends, and school events.

Four Weeks to Go

- Workers unite! Form the working committee; people who'll be in on the planning, organizing, clean-up, etc.
- Schedule a planning meeting.
- Recruit your facilitators and schedule a facilitator training for at least two weeks before the event.
- Pencil it in: finalize the event date; send a preliminary announcement to parents and teachers so they can keep that Saturday free.

Three Weeks to Go

- Send a letter about the event to parents letting them know what kind of materials to

bring, and urging them to pre-register. Sample letters in English and Spanish are at the end of this Section.

- Put together a list of the materials you'll need, for the training and the event, based on what's in the Step-by-Step Activities section. Remember that you'll probably need the items in large quantity, depending on how many participants pre-register.
- Try to use community resources when you start to collect your materials. For instance, check around to see if someone could donate some of the appliances or hardware for "Discovering How it Works." Ask lunchroom employees to save cardboard boxes or foam packing material, so you can use it for building. Ask teachers to collect socks, plastic bottles, or building materials. See if local merchants would be willing to donate materials.
- Blueprint for success; draw up a floor plan of the room where you'll be holding "Super Science Saturday," and decide where each activity will take place. Take the nature of individual activities into account: participants will be working on tables while "Making a Mystery Bottle," "Discovering How It Works," and "Going with the Flow;" they'll use the floor when they're "Building with Wonderful Junk;" they'll need tables for working *and* floorspace for tossing bean bags for "In My Estimation." How many tables and chairs will you need; how should they be set up? Figure this out, and leave plenty of working room for large groups of people. Hot tip: try to set up the mystery bottle activity near running water and the building activity in a low-traffic area. You may want to put a table in the "Building with Wonderful Junk" space, to hold the smaller materials.
- Train your facilitators.

Two Weeks to Go

- Get together the supplies you'll need *apart* from the activity materials. First, each activity area will need to be clearly labeled and identified. To do this, you'll want balloons—a different color for each area—and signs with the activity names lettered on them. You'll need name tags, which should be color-coordinated with the balloons; participants will start by doing the activity at the table where balloons match their tag color. Make the tags with stick-on dots or markers. You'll also need poster board and three different colors of dried beans—e.g., pinto, kidney, and lima—to do the evaluations (see "Getting out the vote.") Lastly, you'll need a container for each activity area—large plastic containers or empty milk cartons work fine.
- Have food for the stomach as well as the mind: arrange to provide some refreshments, like juice and crackers for the children and coffee for the adults.
- Try to line up someone—a community member, parent, or teen—to photograph or videotape the event. "Super Science Saturdays" deserve to be preserved for posterity!

One Week to Go

- You should have most of the pre-registration forms back by this time. Send a notice home with children to collect the last forms, and remind everyone one more time about what's happening, when. Or just have teachers ask children to prod their parents.
- Check it out: use the materials lists accompanying the activities to check that your supplies are all ready.
- Meet with your work committee so you can go over specific assignments. *Don't forget the all-important clean-up crew.*
- Make the evaluation signs (see "Getting out the vote.")
- Color-coordinate: make the name tags, using a colored dot or a magic marker in the corner of the tag. Keep tags of the same color together, and leave the name space blank—participants will fill that in.

Doing It

It's going to take about an hour to set up the room for the big event. Use your floor plan, and get the activity and registration and refreshment areas in order; facilitators can set up their own areas. Two people should handle registration, and setting up the registration table.

Registration

Have markers; name tags sorted into four piles by color; and a sign-in sheet on the registration table. As parents and youngsters come in, have them sign the sheet and give them the tags—the same color for each family. Have participants fill their names in on the tags. Give every new family that signs in a different color, until you've given out all four colors (or three, as the case may be); then start over again. When you finish, there should be four (or three) equally-sized color groups. Participants will begin working at the activity area that has balloons the same color as their name tags.

As soon as children come in, have them take the things they've brought along as their "entrance fee" to the appropriate activity area. This keeps them occupied, while others arrive and register.

Getting out the Vote

At an event like "Super Science Saturday," it's helpful to find out what activities the participants liked best and least. That way, you can keep improving the event each time you hold it. Here's an evaluation system in which children quite literally "spill the beans" to let you know how enthusiastic they were about each activity.

On a table at every activity area, there should be a sign with the words "Great!"; "Good"; and "O.K." written across the top. Tape a different kind of bean—say, a kidney bean, a pinto bean, and a lima bean—under each word.

Place separate containers of each kind of bean in front of the sign. Put a large, empty container on the table. After children have completed an activity, ask them to choose the bean that describes how they felt about it, and drop it into the empty container.

At the end of the program, the beans in each jar will tell the story—and you can plan your next "Super Science Saturday" accordingly."*

Welcome to Super Science Saturday!

Once families are grouped at the different activity areas, welcome everyone, and explain what will be going on; every 30-35 minutes, each group will shift, clockwise, to a new activity station. Everyone will have a chance to do all of the activities.

Let participants know that facilitators will be at each area to introduce the activity, answer any questions they have, and make sure things are running smoothly. Facilitators will also explain the evaluation process to each group, as they move around the activity areas.

A word of advice: try to stay on schedule, since delays only take time away from the activities.

**The "bean" evaluation was developed by Patricia B. Campbell, Campbell-Kibler Associates, who served as evaluator for the program.*

Did you know?

Out of all engineers, 2.6% are Hispanic and 3.8% are Black. More Hispanics are industrial engineers than any other kind. Blacks are more likely to be chemical engineers than any other kind.

Sample Super Science Saturday Schedule

8 am:	Work crew and facilitators arrive and set up
9:00:	Registration and refreshments (available throughout the morning)
9:20:	Welcome everyone and briefly explain what will be happening
9:30:	Facilitators start the activities
10:00:	Give a five-minute warning
10:05:	Stop the groups; clean up
10:10:	Do the evaluation and have groups move to next activity
10:15:	Activity begins
10:45:	Give a five-minute warning
10:50:	Stop the groups; clean up
10:55:	Do the evaluation and have groups move to next activity
11:00:	Activity begins
11:30:	Give a five-minute warning
11:35:	Stop the groups; clean up
11:40:	Do the evaluation and have groups move to next activity
11:45:	Last activity begins

Sample Skills List

In My Estimation: Making and Tossing Bean Bags

Specific Skills Developed

Spatial Relations
Estimation
Problem-Solving
Measurement
Decision-making
Observation
Eye-hand coordination
Pouring
Independence
Aiming—throwing

Overall Learning Benefits

Increased parent/child interaction
Experience with the relationship of force and distance
Practice helps to develop skills
Varying target patterns leads to recognition of shapes, colors, numbers, family names
Increased use of senses e.g., touch, sound, sight
Increased verbal skills—new vocabulary
Cooperation and social interaction, such as taking turns

En Mi Estimación: Haciendo y Tirando Bolsas de Habichuelas

Habilidades Específicas Que Se Desarrollan

Relaciones Espaciales
Estimación
Resolviendo el Problema
Medida
Haciendo decisiones
Observación
Coordinación de Ojo y Mano
Echando
Independencia
Apuntando—Tirando

Beneficios de lo que se Aprende Generalmente

Más intercambio entre Madre/Padre e hija/hijo
Esperiencia con la relación de fuerza y distancia
La práctica ayuda a desarrollar habilidades
Variación en el patrón del blanco resultan en el reconocimiento de formas, colores, números, y nombres familiares
Más uso de los sentidos, por ejemplo, tocar, oir, y ver
Más capacidad verbal—nuevo vocabulario
Cooperación e intercambio social, como turnandose

Sample Letter: Playtime Is Science™

Dear Parents:

An exciting new parent and child activity program, Playtime Is Science™, is going to be offered at our school for children in grade(s)_____. Come and learn how you can help your child gain important science skills using materials that can be found around the house. The activities will not only be educational—they'll also be fun for you and your child to do together. Sign up early so you can participate in this program, which has been successfully tried in many schools.

There will be_____ sessions (in English and Spanish), and it is important to try to attend all of them. The sessions will be held—

Session 1 (fill in date) (Parents Only)
Parents Are Problem-Solvers Exploring the science we use every day—opening jars, storing food, and using appliances.

Session II (fill in date) (Parents and Children)
Go With the Flow—Making and Using Sieves

Session III (fill in date) (Parents and Children)
Creating a Mystery Bottle

Session IV (date) (Parents and Children)
In My Estimation: Making and Tossing Bean Bags

Session V (date) (Parents and Children)
Building with Wonderful Junk

Session VI (date) (Parents and Children)
Discovering How It Works

Playtime Is Science™ was developed by Educational Equity Concepts, an organization that has created many interesting programs and materials for children. We hope you will take advantage of this opportunity to work with your child in a program that says "Science is for Everyone."

Please fill out this part and return it to the school.

I_____ will_____ will not attend the Playtime Is Science™ program with my child.

Parent(s) Name(s)_____

Child(ren's) Names(s) _____ class(es) _____

Muestra de Carta:
El Recreo es Ciencia

Queridos Madres y Padres:

Un programa nuevo e incitante para madre/padre e hija/hijo, Playtime Is Science™ ("Recreo es Ciencia"), se le ofrece en nuestra escuela para niñas/niños en grado(s) _____. Vengan y aprendan como pueden ayudar a su(s) niña(s)/niño(s) a desarrollar habilidades que son importantes en la ciencia, usando materiales que facilmente se encuentran en la casa. Las actividades, no solamente serán educacionales—sino también le serviran de diversión a Uds. y sus hijas/hijos al hacerlo juntos. Inscribanse pronto para participar en este programa, que ha tenido gran éxito en muchas escuelas.

Habrán _____ sesiónes (en inglés y español), y es importante que traten de asistir a todas ellas. Las sesiónes serán:

Sesión I -_____ (fecha)_____ (Solamente las Madres y los Padres)
Madres y Padres Resuelven Problemas - Descubriendo la ciencia que usamos diariamente—abriendo potes, guardando comida, y usando aparatos.

Sesión II -_____ (fecha) (Madres/Padres y Niñas/Niños)
Sigan La Corriente - Haciendo y Usando Cedazos

Sesión III -_____ (fecha)_____ (Madres/Padres y Niñas/Niños)
Creando Una Botella Misteriosa

Sesión IV -_____ (fecha)_____ (Madres/Padres y Niñas/Niños)
En Mi Estimación: Haciendo y Tirando Bolsas de Habichuelas

Sesión V -_____ (fecha)_____ (Madres/Padres y Niñas/Niños)
Construyendo con Basura Maravillosa

Sesión VI-_____ (fecha)_____ (Madres/Padres y Niñas/Niños)
Descubriendo Como Trabaja

Playtime Is Science™ fue desarrollado por Educational Equity Concepts (Conceptos de Igualdad en Educación), una organización que ha producido muchos programas y materiales interesantes para niñas/niños. Esperamos que aprovechen esta oportunidad para participar con sus hijas/hijos en un programa que dice "La Ciencia es Para Todos."

Por favor de llenar esta parte y devolverla a la escuela.

Yo____ voy____ no voy atender con mi niña(s)/niño(s) al programa Playtime Is Science™.

Nombre(s) de Madre/Padre_____

Nombre(s) de Hija(s)/Hijo(s)_____ Grado(s)_____

Sample Letter: Super Science Saturday

Dear Parents and Children,

We are happy to invite you to participate in SUPER SCIENCE SATURDAY on _____, from 9 a.m. to 12:30 p.m. at our school.

On Super Science Saturday you will do hands-on activities designed to be both fun and educational. You will take part in each of four activities.

1. Creating a Mystery Bottle—Make your own mystery bottle and take it home to share with others.

2. Building with Wonderful Junk—interesting items that are usually thrown out are used to make wonderful creations—a sight to see.

3. Discovering How it Works—children are able to take familiar items apart and put them back together to discover how they work—an opportunity not often experienced by many.

4. Making and Tossing Bean Bags—children make bean bags, design their own targets and play. Targets and bean bags are theirs to keep.

Dress casual—the mood is festive, with balloons and interesting items to see, touch, smell, take apart, put together, create with and use to experiment. As an "entrance fee" to Super Science Saturday, please bring a bag with the following items: old socks without holes; at least two empty plastic soda or water bottles with the tops (10-16 oz. cleaned and with labels soaked off); and a collection of things that are usually thrown away, such as egg cartons, cereal boxes, paper towel rolls, and containers of all kinds—the more you bring, the better.

We hope you will join us and let us know by filling out and returning the bottom portion of this letter by _____.

Super Science Saturday

Yes, I will be attending on _____

Name _____

Child's Name _____ Grade _____

Muestra de Carta: Sábado de Ciencia Superior

Queridos Madres/Padres e Hijas/Hijos:

Estamos muy contentos de poder invitarlos a participar en "Super Science Saturday" ("Sábado de Ciencia Superior") el _____ de _____ de 9 a.m. hasta las 12:30 p.m. en nuestra escuela.

En "Super Science Saturday" habrán actividades designadas para ser tanto educativas como divertidas. Participarán en cada una de cuatro actividades.

1. *Creando Una Botella Misteriosa*—Haga su propia botella misteriosa y llevesela a su casa para compartir con otros.

2. *Construyendo con Basura Maravillosa*—materiales interesantes que usualmente se votan se usaran para hacer creaciones muy lindas—que escena.

3. *Descubriendo Como Trabaja*—niñas/niños pueden desmontar y montar objetos familiares para descubrir como es que trabajan, una oportunidad y experiencia que muchos no han tenido con frecuencia.

4. *Haciendo y Tirando Bolsas de Habichuelas*—niñas/niños hacen bolsas con habichuelas, diseñan sus propios blancos y juegan. Las bolsas y los blancos son suyos.

Vistanse con ropas casuales—el tema es festivo, con bombas de inflar y varias cosas interesantes para ver, tocar, oler, desmontar, montar, crear y experimentar. El costo de la entrada a "Super Science Saturday" será una bolsa llena de las siguentes cosas: medias viejas sin rotos; por los menos dos botellas de plástico vacias y con sus tapas (de 10-16 onzas, limpias y sin etiquetas); y una colección de cosas que usualmente votan, como cartones de huevos, cajas de cereal, los rollos de toallas de papel, y envases (plásticos) de todas clases—mientras mas traigan, tanto mejor.

Esperamos que nos puedan acompañar y que nos dejen saber llenando y devolviendo la parte de abajo de esta carta para la fecha _____

Super Science Saturday

Sí, voy atender._____

Nombre(s)_____

Nombre(s) de Niña(s)/Niño(s)_____ Grado(s)_____

Finding Out More: Resources

Once you start thinking about ways to provide young children with science experiences, you will find many picture books, magazines, and parent activity books that will give you new ideas for science activities. The children's librarian in your local library is a good source for finding new science-related material. When you look for new resources, make sure they convey the message that "science is for everyone."

The resources listed below are divided into three categories: Facilitator Resources—posters, catalogs, and guides that will help create a "science is for everyone" environment in the training room; Parent/Facilitator Resources—books that provide ideas for additional activities that you can add to the training or that parents can try at home; and Picture/Activity Books for Children.

Facilitator Resources

National Association for the Education of Young Children, 1834 Connecticut Ave., N.W., Washington, DC 20009.

A wonderful series of posters that show children exploring, discovering, and learning. The full-color posters are diverse in terms of race/ethnicity Suggested posters include numbers: 479, 483, 484, 485, 488, 491, 493, 496. $3 each.

Educational Communications, General Electric Company, Fairfield, CT 06431.

A three-booklet Career Series that shows women and men of diverse racial/ethnic backgrounds engaged in science-related work. The text is not appropriate for young children but the pictures are great for collaging. Available as single sets or classroom quantities of 25. FREE.

Gryphon House Teacher Resource Catalog, P.O. Box 275, Mt. Rainier, MD 20712.

This high-quality early childhood catalog offers many hands-on science books suitable for teachers and/or parents.

Science and Children Magazine. National Science Teachers Association, 1742 Connecticut Ave., NW, Washington, DC 20009.

An excellent resource for curriculum ideas and collage pictures; features a monthly early childhood column. Comes with a $35 basic NSTA membership.

Sprung, Barbara, Froschl, Merle, and Campbell, Patricia C. *What Will Happen If...Young Children and the Scientific Method.* New York: Educational Equity Concepts, Inc. (114 E. 32nd St., New York, NY 10016), 1985.

A classroom curriculum that complements the Playtime Is Science activities.

Teachers' Laboratory, Inc. 104 Canal St., P.O. Box 6480, Brattleboro, VT 05302-6480.

This catalog includes many hands-on science activity books. Especially recommended is "Think and Do," science activity cards for young children. They also publish *Connect,* a monthly newsletter containing practical science and math ideas.

Parent/Facilitator Resources

Althouse, Rosemary. *Investigating Science with Young Children.* New York: Teachers College Press, 1988.

This book includes 85 activities (for children ages 3-5) that use the process approach for teaching science.

James, Jeanne C. and Randy F. Granovetter, illustrated by Sheila Krill. *Water Works.* Lewisville, NC: Kaplan Press, 1987.

Water play activities, organized into age groups, use water in a dish pan, a water table, a sprinkler, a small pool, and a large pool. (Also can be purchased from the Early Childhood Bookhouse in Portland, Oregon.)

Neugebauer, Bonnie, ed. *The Wonder of It: Exploring How the World Works.* Redmond, WA: Exchange Press, Inc., 1989.

A series of articles that underscore the importance of hands-on science experiences for young children. Also includes practical ideas for activities and an extensive bibliography of children's books.

Richards, Roy, Colles, Margaret, and Kincaid, Doug. *An Early Start to Science.* Milwaukee, WI: McDonald-Raintree, Inc., 1987.

A nicely illustrated book of simple science experiments that are fun to do.

Scienceland. Scienceland, Inc., 501 Fifth Ave., New York, NY 10017-6165.

A children's magazine that focuses on a single topic in each issue. Eight issues per year feature full-color photographs and illustrations.

Stetten, Mary. *Let's Play Science: Projects for Home and School.* New York: Harper and Row Publishers, 1979.

Simple science activities to do with found materials in the home and/or classroom.

Williams, Robert A., Rockwell, Robert E., and Sherwood, Elizabeth A. Illustrations by Laurel J. Sweetman. *Mudpies to Magnets: A Preschool Science Curriculum.* Mt. Rainier, MD: Gryphon House, 1987.

Here are 112 ready-to-use science experiments that provide hands-on learning activities. Includes tips for getting started with children and science.

Picture/Activity Books for Children

Craig, Jat. Illustrated by Paul Harvey. *Como Son Los Habitantes del Mar? (What's Under the Ocean?)* New Jersey: Troll Associates, 1982. New York: The Bilingual Publications Co., 1987.

A simply-written book about sea animals.

Dunham, Meredith. *Shapes: How Do You Say It?* New York: Lothrop, Lee & Shepard Books, 1987.

A colorful multilingual (English, French, Spanish, Italian) shapes book. Includes guidelines on how to pronounce foreign words.

Hoban, Tana. *Shapes, Shapes, Shapes.* New York: Greenwillow Books, 1986.

Photographs of different city and country scenes show a variety of shapes in the world.

Hoban, Tana. *Circles, Triangles, Squares.* New York: MacMillan Publishing Co., 1974.

Beautiful photographs reveal the circles, triangles, and squares in our environment.

Homan, Dianne. Illustrated by Mary Heine. *In Christina's Toolbox.* Chapel Hill, NC: Lollipop Power, Inc. (P.O. Box 1171, Chapel Hill, NC 27541), 1981.

Christina uses the tools in her toolbox to construct a bird feeder; she saws, measures, hammers, and uses a screwdriver. Christina is active and capable and enjoys using tools just as her mother does. The book portrays a Black family in nonstereotypical sex roles.

McMillan, Bruce. *Dry or Wet?* New York: Lothrop, Lee & Shepard Books, 1988.

There are no words, but wonderful photos of scenes that illustrate either wet or dry. Children can easily relate to the pictures, and the book is multiracial.

Simon, Seymour. Illustrated by Stella Ormai. *Soap Bubble Magic.* New York: Lothrop, Lee & Shepard Books, 1985.

Bubble experiments (some may need to be adapted for younger children) are presented in storybook form with multiracial/ethnic characters. Discovery questions are provided along with some facts about soap bubbles. A good book for parents and children to read together.

Shulevitz, Uri. *Rain, Rain, Rivers.* New York: Farrar, Straus, and Giroux Putnam Publishing, 1969.

A visual poem that shows the different stages and shapes of rain water, from drops to puddles to streams to oceans.

Schneider, Herman, and Schneider, Nina. Illustrations by Harriet Sherman. *Science Fun with a Flashlight.* New York: McGraw-Hill Book Company, 1975.

A group of children at a costume party experiment with flashlights after a power failure. Included are a variety of nighttime and daytime shadow activities. Illustrations are multiracial, and there is a fairly good balance of girls and boys.

Stein, Sara. Illustrated by Otto David Sherman. *A Piece of Red Paper.* Northbrook, IL: Hubbard Press, 1973.

Little text, with colorful illustrations of shapes put together in imaginative ways to form everyday objects.

Wandelmaier, Roy. Illustrated by Irene Trivas. *Como Son Las Estrellas?* New Jersey: Troll Associates, 1982. New York: The Bilingual Publications Co., 1987.

Beautiful illustrations of stars and information on how they are formed.

Zaslavsky, Claudia. Illustrated by Jerry Pinkney. *Count on Your Fingers African Style.* New York: Thomas Y. Crowell, 1980.

Finger counting is a practical strategy in the African marketplace, where people who speak many different languages come together to trade.

Zubrowski, Bernie. Illustrated by Joan Dressler. *Bubbles.* Boston: Little Brown and Company, 1979.

This Activity Book is part of a science series issued by the Boston Children's Museum. Although it is written for elementary school students, it is full of ideas for exploring bubbles that can be adapted for the early childhood level. Other books by Bernie Zubrowski include: *Messing Around with Baking Chemistry* illustrated by Signe Hanson, and *Messing Around with Water Pumps and Siphons,* illustrated by Steve Lindbloom.

About Educational Equity Concepts

Educational Equity Concepts is a national nonprofit organization founded in 1982 to foster equal educational opportunity. The organization designs innovative programs and materials to help eliminate sex, race, and disability bias: offers a broad range of training and consulting services; and engages in a variety of public education activities.

Because Educational Equity Concepts believes that equal opportunity should "begin at the beginning," the organization has developed a number of unique and nationally-respected early childhood programs. However, Educational Equity Concepts is equally committed to increasing opportunities for young people and adults who have not had the chance to "begin early." And so the organization's program areas span the educational continuum: early childhood, elementary, young adult, and community education.

In all of its programs, materials, and services, Educational Equity Concepts's approach is "inclusive," making the connections between various factors that can limit individual growth and potential at any age. Playtime Is Science™, our parent and child activity program, and *What Will Happen If ...Young Children and the Scientific Method*, our classroom curriculum, are a direct result of that endeavor. By ensuring that all children have equal opportunity to learn essential science skills we help them to develop their potential unlimited by bias due to sex, race/ethnicity, disability, or socioeconomic status.

About the Authors

Barbara Sprung is Co-Director of Educational Equity Concepts, Inc., a national nonprofit organization she co-founded with Merle Froschl in 1982. Ms. Sprung has been a pioneer in the development of early childhood programs and materials that are nonsexist, multicultural, and inclusive of images of children and adults with disabilities. Her published works include *Non-Sexist Education for Young Children: A Practical Guide* and *What Will Happen If...Young Children and the Scientific Method*. Ms. Sprung received a Bachelor of Arts in Early Childhood Education from Sarah Lawrence College and a Masters in Child Development from Bank Street College of Education.

Linda Colón is the Science Program Specialist for Educational Equity Concepts, Inc., where she also provided bilingual training for the Playtime Is Science program. Ms. Colón, active in parent involvement programs in District IV in New York City, is co-author of *Including All of Us: An Early Childhood Curriculum About Disability*. She received her Bachelor of Science degree in Psychology at Hunter College, CUNY.

Merle Froschl is Co-Director and co-founder of Educational Equity Concepts, Inc. Ms. Froschl has developed curriculum, conducted in-service training and staff development workshops. Her published works include *Feminist Resources for Schools and Colleges: A Guide to Curricular Materials* and *What Will Happen If...Young Children and the Scientific Method*. Ms. Froschl received a Bachelor of Science degree in Journalism from Syracuse University.

Sandra Jenoure is Science Coordinator at PS 155, Community School District IV in New York City. She also has been a Science Cluster Teacher, a Science Curriculum Writer, and Teacher Trainer. Ms. Jenoure received her Bachelor of Arts degree and Elementary Education Graduate Credits at Hunter College, CUNY; a Master of Arts degree in Administration and Supervision, and a Master of Science degree in Environmental Studies from City College, University of the City of New York.

Notes

Parents Are Problem Solvers

Materials

- Task cards (included)
- Newsprint, masking tape, and a marker, to make the skills list.
- And, for each of the three groups...

Group One

- A variety of vacuum packed and/or "stuck" jars and bottles (apple sauce, pickles, nail polish).
- A variety of things commonly used to open jars and bottles—a spoon, pliers, bottle opener, can opener, butter knife, a piece of rubber material, a sponge or sponge cloth, a dish cloth, etc. Include as many items as possible.
- A shoe box or a basket to hold the opening devices.

Group Two

- An old-fashioned food grinder
- Soda crackers or Play-Doh (not clay!) to be ground up
- A plate or bowl to catch ground material

Group Three

- Three cups of rice and three cups of beans, in separate, zip-lock bags.
- Several plastic containers. They should be fairly large, and of different shapes—tall and thin, tall and wide, short and wide, etc. Try pasta cannisters, yogurt containers, plastic half-gallon ice cream containers, or sugar/flour cannisters. Two of the containers should be one-quart size, which will be big enough to hold, separately, all the rice and all the beans. The rest of the containers should be too large, or too small.
- A measuring cup

Time

90 minutes

Getting Ready

Set up the room so three groups can work at three separate tables. Have the materials and task card for each group ready, and put the newsprint up on the wall in a central location. After the introductions, give each of the groups its cards and materials.

Activity

1. Circulate and facilitate as people work on their tasks, making sure that everyone understands what they're supposed to be doing.
2. When each group has finished its task, and is demonstrating and talking about it with the large group, ask open-ended questions to keep discussion going...
   - "Tell us why you chose to do it that particular way?"
   - "Did you start out doing it a different way?"
   - "Does anyone have a suggestion for doing this differently?"
   - Keep the discussion fun, and personalized to reflect past experiences people may have had with these kinds of activities.
3. Do the skills lists, with participants.
4. Parents should leave with a general understanding that the learning which just took place involves concepts—the use of friction for opening jars; the use of a simple machine like the food grinder, to change the texture of food; or the concept that, regardless of weight, three cups of anything is three cups.

TASK CARD: Opening jars

One person in the group should read the following instructions out loud. Another person should take notes on what happens, so your group can tell the rest of us what you did for your task.

Here's the story: you've got to open up these jars and bottles, but the tops are stuck!

1. What can you do to open them? Discuss solutions; write the ideas down.
2. Now, as a group, pick one solution and try it. See if you've got what you need to open the jars, in the box. If one solution doesn't work—try another.
3. Do you remember what adults in your family did to open stuck jars when you were growing up?

TASK CARD: The food grinder

One person in the group should read the following instructions out loud. Another person should take notes on what happens, so your group can tell the rest of us what you did for your task.

Here's the story: A friend has given you a second-hand food grinder. But before you can use it, you've got to figure out how to put it together.

1. As a group, discuss how to put the food grinder together. What's the first thing you think you should do?
2. O.K.—put the food grinder together, as a group. Make sure to note down whatever you did.
3. Try it out—grind the soda crackers (or Play-Doh).
4. Do you remember how people in your family put things together when you were growing up?

TASK CARD: Storing rice and beans

One person in the group should read the following instructions out loud. Another person should take notes on what happens, so your group can tell the rest of us what you did for your task.

Here's the story: You've just bought bags of rice and beans, and you want to store them in your cabinets.

1. Look at the containers on the table. Pick whichever one you think will most efficiently hold all the rice, and then the one you think will most efficiently hold all the beans.
2. Now, as a group, decide which of the containers to try. Do they work? If not, try others.
3. Estimate how many cups of rice and beans you have.
4. Use the measuring cup to measure the rice and the beans. How many cups of each do you have?

TARJETA DE TAREA: Abriendo Potes

Una persona en el grupo debe leer las siguiente instrucciones en voz alta. Otra persona debe coger notas de lo que pase, asi el grupo puede contarnos que hicieron en su tarea.

Aqui esta el cuento: tienen que abrir estos potes y botellas, pero las tapas no abren!

1. ¿Que pueden hacer para abrirlos? Discutan algunas soluciones y escriban sus ideas.
2. Ahora, en grupo, escojan una solución y tratenla. Miren a ver si lo que necesitan para abrir los potes esta en la caja. Si esa solución no trabaja, traten otra.
3. ¿Se recuerdan, cuando niñas/niños, que hacian los adultos en su familia para abrir los potes difíciles?

TARJETA DE TAREA: Maquina de Moler Comida

Una persona en el grupo debe leer las siguientes instrucciones en voz alta. Otra persona debe coger notas de lo que pase, asi el grupo puede contarnos que hicieron en su tarea.

Aqui esta el cuento: Un amigo o amiga le han dado una maquina de segunda mano de moler comida. Pero, antes de usarla, tienen que determinar como se montan las piezas.

1. En grupo, discutan como juntar las piezas. ¿Que creen que deben de hacer primero?
2. Esta bien—ahora, en grupo, monten el moledor. Estén seguros que escriban todas las cosas que hicieron.
3. Tratenlo—muelan las galletas (o el "Play-Doh").
4. ¿Se recuerdan, cuando niñas/niños, como las personas en su familia montaban las cosas?

TARJETA DE TAREA: Guardando Arroz y Habichuelas

Una persona en el grupo debe leer las siguiente instrucciones en voz alta. Otra persona debe coger notas de lo que pase, asi el grupo puede contarnos que hicieron en su tarea.

Aqui esta el cuento: Han comprado bolsas de arroz y habichuelas, y quieren guardarlas en sus gabinetes.

1. Miren los envases encima de la mesa. Escojan el envase que crean que efectivamente sostenga todo el arroz, y uno que efectivamente sostenga todas las habichuelas.
2. Ahora, en grupo, decidan cuales envases van a tratar. ¿Trabajan? Si no, traten otros.
3. Hagan una estimación de cuantas tazas de arroz y habichuelas tienen.
4. Usen una taza de medida para medir el arroz y las habichuelas. Cuantas tazas de cada uno tienen?

Go with the Flow: Making and Using Sieves

Materials

- A variety of foil or plastic containers, i.e., foil cake pans or pie plates; heavy, coated cardboard or thin plastic plates (about an inch deep with a rim around the edge) or bowls; take-out salad containers; etc. You may want to stay away from styrofoam, for environmental reasons.
- Thick and thin nails, with large heads; or pencils with dull points, for making holes in the containers.
- A water table, or several large basins to hold water. Figure on three parent/child pairs per water table or two parent/child pairs per basin.
- Food coloring.
- Smocks for the children—easily made by cutting arm and neck holes in plastic trash bags. Tall kitchen bags are a good size for children.
- A selection of plastic containers to pour from: measuring cups, orange juice containers, deli containers, etc. Encourage sharing! Divvy these up, one per pair.
- Sponges, and/or a small mop for cleaning up spills.
- Newspaper—to cover floors and tables.

Time

About 10 or 15 minutes for children to make the sieves, and 20-30 minutes for them to play with the sieves and water.

Getting Ready

Cover the floor beneath the water tables or basins with several layers of newspaper. Make sure you tuck the paper under the table legs, so children don't trip. If you're using basins, also put several layers of newspaper down under them. Fill the water tables/basins about half-way, and place one or two bottles of food coloring near each basin. Have the plastic smocks ready.

Set the containers, and the nails and pencils, away from the basins but on the same table, so children can make the sieves and move right over to the water. If there isn't enough table space, they can make the sieves on the floor.

Activity

1. Have a sample sieve ready to show, before the activity starts. Make the sieves by poking holes in the foil, cardboard, or plastic containers with nails and/or pencils. It's easiest (especially on the table!) if you do this with the container turned upside down, so the nails don't poke directly through, into the surface below.
2. Have children gather in the sieve-making area.
3. Explain to them that they're going to be making a tool for experimenting with water. Hold up the sample sieve and ask if anyone's seen something like it. Discuss sieves, colanders, and strainers: let children tell you whatever they know about using such devices.
4. Show children how to use the nails and pencils to make a sieve.
5. Have everyone choose a container and begin making a sieve. As they work, see if children notice the varying thicknesses of the different nails, or of the nails and the pencils. Speculate about the size of the holes the different tips will make, and test whether children's guesses are right.
6. As children complete the sieves, move them over to the water area, so they can experiment.
7. Let children play around with their sieves in the water; tell them they can add food coloring, if they want to change the water color.
8. Parents can facilitate the sieve-making process and the experiments with water. They should let children do as much as possible by themselves, while asking questions to make youngsters think. Like...
   - "What does it sound like when the nail makes a hole in the sieve?"
   - "Did you make lots of holes? How many? Shall we count them together?"
   - "What does the sound of water remind you of?"
   - "What happens when you pour water into the sieve, fast?"
   - "What's different when you let water flow out of the sieve from high up, and when you hold the sieve low down?"
9. Circulate as people work, asking open-ended questions and facilitating color-mixing, discussion, and, of course, clean-up of inevitable spills.

Conceptual Background

This activity is meant to teach children something about the physical properties of water. They've probably already seen sieves, colanders, strainers, watering cans, spray bottles, or similar things used around their home. Now they can see how these devices work, at first hand.

Water first pours out of their sieves in streams, and then—when the container is almost empty—in drops. Finally, even the drops will cease, although there may still be a little water left in the container.

Children will note that water which pours out through small holes in their sieves forms drops as it falls. This is because the strong attractive forces of the molecules are obeying a natural law, and pulling the water into the shape that takes up the least possible surface area—that of a sphere.

But when water pours through large holes in the sieves, its weight is so much greater that gravity overcomes the attractive forces of the molecules, and pulls the water downwards in a stream.

Glossary

Gravity: The force that pulls one object towards another.
Molecule: The smallest unit of a compound still retaining the chemical properties of that compound.

Extensions

Patterns, Currents, and Color Mixing with Food Coloring

1 Gather food coloring and plastic straws (be sure each child uses his/her own straws. Have extras handy).
2 Have several small bottles of food coloring near each basin or water table.
3 Let children choose one color and put a few drops in the water to observe the patterns it makes.
4 Give each child her/his own straw to create currents in the food coloring.
5 Have the children experiment with mixing colors together. Start with two colors, and then add others.

Cups 'n Holes

1 Gather a variety of cardboard and wax cups (2-3 per child).
2 Have the children poke one hole in each cup in a different place (on top, on bottom, etc.)
3 Use the cups in the water along with the sieves.
4 Compare the way the water comes out of the cups with the way it comes out of the sieves.

Sieves 'n Sand

1 Have the children make sieves and use them in sand instead of water.
2 Observe the way the sand comes through the holes.
3 Listen to the sounds the sand makes.
4 If possible have both water and sand, and let children compare the way the sieves work in both. Have paper towels handy so children can dry their sieves before moving from water to sand.
Note: If the sieves are not dried off between use in water and sand, remember that mud is a scientific medium for young children.

Creating a Mystery Bottle

Materials

- As many—or more—clear, plastic, 16-ounce soda bottles, or 12-ounce bottled-water containers, as there are children. Bottles should be clean inside, with labels soaked off.
- One half to one cup of vegetable oil, per bottle, depending on size.
- At least two one-cup measuring cups, per group of 3 or 4 children.
- Funnels (optional).
- Food coloring (one four-color package per group of 3 or 4).
- Water: in quart-size pitchers, juice containers with lids, or plastic bins.
- Newspaper.
- Paper towels to clean up.

Time

About 30 minutes—20 to make the bottles, 10 to experiment with them.

Getting Ready

Cover the work table with newspaper, and put oil, water, food coloring, and empty bottles on it. Keep the paper towels nearby, for sudden emergencies. Working with three or four children at a time, you'll be demonstrating how to make a bottle; then each child will make his or her own. If you have extra bottles, children can make more than one. It's not crucial for them to follow directions exactly when they do it themselves—they can vary the steps and still have a successful bottle to play with.

Have a sample mystery bottle out on the table, for youngsters to see when they come in.

Activity

Watch what I do...

1. Fill the measuring-cup with water.
2. Choose the food coloring color you want to use.
3. Squeeze a few drops into the cup.
4. Ask the children to tell you what's happening, what the water looks like with the food coloring in it.
5. Pour the colored water into the bottle, using the funnel if necessary. Again, ask the children, "What's happening?" "What does it look like now?"
6. Fill the measuring cup with oil.
7. Pour the oil into the bottle of colored water and ask the children to tell you what they see.
8. Screw the top (tightly!) on the bottle.
9. Pass the bottle around to each child, and tell them they're about to make their own mystery bottles.

...Now you do it too

1. Facilitate as children make their own bottles. Let them pick the colors by themselves, mixing colors if they want; let them do the pouring themselves.
2. After children have finished their bottles, have them experiment. Tell them to play with the bottles, turn them upside down, on their sides, roll them around, shake them, etc.

Conceptual Background

Children doing this activity will learn the truth in an old saying: oil and water don't mix. In fact, they'll learn something about the properties of three different liquids: oil, water, and food coloring. They'll discover how food coloring blends with water, and observe what happens when two colors mix; they'll have a chance to create new colors by combining different ones.

The mixture formed by water and food coloring is called a solution. Water is the solvent, and the coloring is the solute. When a solute dissolves, the solute particles spread evenly through the solvent, in a process known as diffusion.

Oil, less dense than water, will always rise to the top of the bottle, even when it's poured in first. Oil and water are immiscible—in other words, they are liquids which don't form a solution.

Glossary

Density: Mass of a substance, per unit of volume.
Diffusion: Gradual mixing of the molecules of two or more substances, owing to random molecular motion.
Dissolve: Cause to pass into solution.
Immiscible: Liquids that won't mix to form a solution; they exist in contact with each other in separate layers.
Miscible: If two liquids mix to form a solution, they are said to be miscible.
Mixture: A combination of two or more substances, where each retains its chemical identity.
Solute: The material dissolved in a solution.
Solution: A homogenous mixture—a uniform blend—of two or more substances.
Solvent: A liquid substance capable of dissolving or dispersing one or more other substances.

Extensions

What Will Happen If...?

1 Vary the way the ingredients go into the mystery bottle. Ask the children, "What will happen if:
- we mix the food coloring in the oil and then make the mystery bottle?"
- we pour the oil in the bottle first and then add the water, and then add the food coloring?"

2 Ask the children to make up their own "What will happen if" questions and try them out.

Adding Interesting Objects

1 Gather a variety of small objects—screws, paper clips, sequins, other decorative sewing items.

2 Have the children choose 3-4 objects and drop them one at a time into their bottles.

3 Ask them to observe what happens to each object:
- Which object fell quickest? Slowest?
- Are some objects still floating?
- What happens to the objects when you shake your bottle?

Salad Dressing Chemistry

1 Gather the following materials:
- vegetable oil, vinegar, and a variety of dried spices—oregano, basil, pepper, paprika. You will need about ⅔ cup of oil and ⅓ cup of vinegar per child.
- small, clean plastic jars or bottles.
- hand-held magnifying glasses (optional).
- measuring cups.
- a watch or egg timer.

2 Ask the children to measure ⅓ cup of vinegar and pour it into their jars.

3 Let them choose the spices they want and add them to the vinegar.

4 Cover the jar and shake it. Observe what happens. Look at the mixture through the magnifying glass.

5 Measure the ⅔ cup of oil, pour it into the jar, let it stand for a few minutes. Observe what happens.

6 Shake the jar vigorously 10 times. Everyone can count together.

7 Observe what happens when the mixture stands for a few minutes. Look through the magnifying glass.

8 Shake the jar twenty times. Does it take longer for the mixture to separate than it did after ten shakes? You can time how long it takes the mixture to separate with a watch or an egg timer.

9 Everyone can take home her/his salad dressing.

In My Estimation: Making and Tossing Bean Bags

Materials

- Dried beans of different sizes. Try navy beans (small), pink beans (medium), and kidney beans (large).
- Large, wide-mouthed containers to hold the beans: plastic bowls, plastic half-gallon ice cream containers, two-pound deli containers, foil lasagna pans, etc.
- Various-sized measuring cups, two per group of four children.
- An assortment of clean discarded socks, any size, but without holes.
- Sturdy rubber bands
- Sharp scissors, so you can cut off the tops of the socks. (You may want to keep these out of childrens' reach.)
- Large pieces of paper to make the targets—oaktag, or any fairly stiff paper about 20"x30", will do fine.
- Interesting, large shapes that children can trace to make the targets: round pot covers, square or rectangular boxes, etc.
- Assorted thick markers and crayons, for drawing targets.

Time

Give each group 30 minutes to complete the activity.

Getting Ready

Have all your materials assembled before you begin—put the bean bag materials on one table, target materials on another. You'll be working with three to five children at a time, having them make the bags and targets. You'll repeat the activity until everybody has made at least one complete set. Children can work on the floor to make the targets, so they'll have plenty of room.

Activity

1. Gather the children around the bean bag table.
2. Tell children they're going to make their own set, to try here and then take home. Ask them to watch, while you explain the procedure:
   - select a sock
   - fill the foot section with beans, using the measuring cup if you want
   - secure the beans in the sock, with a rubber band
   - cut off the top section of the sock with the scissors
3. Be sure to give children options as you demonstrate the procedure. You might say, "I'm going to measure out my beans with the measuring cup, but you can just take a handful if you want." Or, "I'm using the biggest beans to make my bag—they're called kidney beans. But you can use any size beans you like, or even combine all three kinds."
4. Have children select the sock they're going to use and fill it with beans. Help them secure the top of the sock with a rubber band, then cut the top off with the scissors. If children want to make more than one bean bag, that's fine, as long as they stay in the time limit and you've got enough materials.
5. As each child finishes their bag(s), move them over to the target-making area. Explain what they should do to make their targets...
   - take a large piece of oaktag or paper
   - select the shape you want to use
   - trace or draw the shape onto the paper. Explain to children that the object will be to toss the bag inside the shape they draw
6. Let children get as creative as they want. We've seen youngsters put names of family members, words, pictures, all sorts of things on their targets. If they want to draw their targets freehand—fine! As long as they realize the object is to toss the bag inside the shape they draw. If they want to decorate the paper, or color in the shapes, that's fine too.
7. Be sure each child's target and bean bag are labeled, and let them play for a few minutes.

Conceptual Background

This activity integrates visual-spatial and motor-coordination skills development, with practice in measurement and calculation. On top of that, it gives children a chance for some artistic expression.

As children select the beans to fill their socks with, they'll be making choices about the kind, size, and amount of beans they want to use. They'll have chance to compare using their own judgment on how many beans will fill a sock, with use of a measuring cup to do it.

Once the children's bags are ready to toss, they'll be sharpening their hand-eye coordination, as they try to land their bags inside the targets. They'll have a chance to see if their choice of target size and shape was an appropriate one. That makes this activity a good way for children to develop perceptions about physical space.

Glossary

Spatial-relations: Understanding the space one's body takes up in relationship to the space around her/him. Important for estimating how much space is needed for a given task, e.g. tossing a bean bag onto a target or a ball into a basket.
Motor-coordination: The way muscles work together to efficiently accomplish a task. Gross motor-coordination refers to large movements such as throwing a ball, tossing a bean bag, or climbing. Fine motor-coordination refers to activities that require small, precise movements such as cutting, pasting, and putting together puzzles.
Classifying: Arranging or distributing objects, events, or information in classes according to a method or system.
Sorting: Putting a group of objects together on the basis of any characteristic they have in common, e.g. color, shape, size.
Measuring: Making quantitative observations by comparing to a conventional (an eight-ounce measuring cup) or unconventional (five handsfull) standard.
Estimating: A rough or approximate calculation.
Manipulating materials: Handling or treating materials and equipment skillfully and effectively.
Decision-making: Identifying alternatives and choosing a course of action.

Extensions

Estimating with Beans

1. Gather a variety of different-size measuring objects (cups, scoops, spoons), three varieties of beans (small, medium, and large), small pieces of paper, and pencils.
2. Ask children to choose one type of measure from the selection and estimate (guess) how many scoops, (cups, spoonsfull) it will take to fill the foot of their socks. Older children can jot down their estimate on a piece of paper. The facilitator can write for younger children.
3. As the children fill their socks, they should count how many scoops it actually took to fill the foot of the sock. Was it more than they estimated? Was it less?
4. Ask children to pick a different size bean and repeat the activity. Compare the results.

Sorting Beans

1. Gather several different kinds of beans (whole dried peas, split green peas, split yellow peas, lentils, kidney beans, pink beans), lasagna pans to hold the beans, small paper plates and/or cups.
2. Set the beans out in the lasagna pans and let children sort them in as many ways as they can think of:
   - By sound: Do split peas sound different than kidney beans when poured? Which type sounds louder? Softer?
   - By shape: Which beans are the same shape? Are they also the same size?
   - By color: Put all the same colored beans in a cup/plate.
3. Mix all the beans together in one pan and let children decide on different criteria for sorting, e.g. shape, size, or color.

Counting Beans

1. Gather three sizes of beans, pans or plastic containers to hold the beans, a variety of small measures (spoons, scoops, 1/4, 1/3, 1/2 cup measuring cups), paper plates/cups, small pieces of paper, pencils.
2. Ask children to fill a measure of their choice with one type of bean and then count as they put the beans into a cup/plate. Children should mark the number of beans on a piece of paper.
3. Repeat the activity with each type of bean, but using the same measure. Compare the amount of beans. Are there as many big beans as small ones? Why?
4. Children also can estimate how many beans are in the same measure, then count the beans and see how close they came.
5. Older children can be asked to count by twos, fives, etc. Younger children may need help in keeping an accurate count.

Building with Wonderful Junk

Materials

- Trashables—lots of them! Try:
  - —empty boxes of all sizes (cereal boxes, shoe boxes, large cartons, gift boxes, egg cartons, etc.)
  - —Cups (paper, plastic, cardboard)
  - —Tennis ball cylinders and other sports packaging
  - —Paper, (tissue, crepe, gift)
  - —Tubes (paper towel rollers, toilet paper rollers, poster tubes, gift paper rollers)
  - —Foil (pie plates, cake pans, etc.)
  - —Whatever else your imagination comes up with
- Masking tape
- Glue
- Scissors

Time

30 minutes for each group of children

Getting Ready

Designate a large space in the room, where the structures can be built and stored. Put your "wonderful junk" on a table, or somewhere on the floor. Have the tape, glue, and scissors conveniently at hand. You'll be working with small groups of children, three or four at a time.

Activity

1. Explain to children that they'll be constructing something out of the "wonderful junk" they see nearby. The rules are that they...
   - must plan and work together
   - must build something as tall as it can be and still stand on its own.
2. Ask children to choose some junk to begin with. Suggest that they use at least one large carton in their structure. Explain that they are free to come back to the pile to select more junk as needed.
3. Encourage children to see that *everyone* participates in the building process. If you observe that someone is not involved, try suggesting that he or she select something special to add to the structure.
4. As children work, facilitate by suggesting ways they can balance their buildings. But guide them to discovering solutions of their own—don't simply walk up and say: "You need to enlarge the base."
5. When the building is finished, have each group take turns telling the other children in the room what they've made and how they made it.

Conceptual Background

Construction activities will keep children busy for hours on end! Not only are they fun, they'll develop children's problem-solving, mathematical, and physical science skills. And when children work cooperatively together, they'll be developing social skills, as well.

Children can explore problems involving shape, size, scale, and stability, in this activity. They'll also be dealing with the concepts of balance, weight, gravity, and symmetry. Trial and error, a valuable way of learning, plays an important role in this project.

The physical properties of the materials being used will influence the kind of structure that's built. Children will discover that...

- seemingly flimsy materials can be strengthened by folding
- triangular shapes are rigid
- tubes have bending strength
- towers need a stable base
- symmetry is important in the overall strength of a tower
- if the weight of the whole structure leans out, beyond the base, the structure will topple.

As a side effect of this activity, children may become aware of how much waste there is in our environment. "Wonderful Junk" is one way to recycle some of that waste.

Glossary

Balance: A stable state, characterized by cancellation of all forces by equal, opposing forces. A state of bodily equilibrium.
Gravity: The force that pulls one object toward another.
Symmetry: A balanced correspondence of size, form, and arrangement of parts.
Weight: The force with which gravity pulls a body toward earth.

Extensions

No Tape? No Glue?

1. Gather the "trashables" as described in the activity. Leave out items that you think will not stay without tape or glue, e.g. tissue paper.
2. Choose small groups (4-8) to work together. Try to choose an equal number of girls and boys.
3. Tell the children that their job is to build something that will stay together without tape or glue.
4. Suggest that they make a plan together before they start to build. Older children can write down their plan. Have some paper and pencils handy for this task.

Choose Your Junk

1. Gather a large of supply of "trashables." Glue and/or tape are optional.
2. Form small groups and ask each group to choose a pile of junk.
3. Tell the children that they can build whatever they want but:
   - they must use up every piece of junk
   - it must be able to stand on its own.

Small Junk

1. Gather a supply of small "trashables," tape, and glue.
2. Form small groups.
3. Explain to the children that:
   - first, each child will make her/his own construction
   - next, they should make one big construction out of all the small ones.
4. Children also can make individual constructions to take home.

Discovering How It Works

Materials

- Two to four small, safe, easy-to-put-together machines. For instance...
  —A manual food grinder (see if you can find someone who has one, or check hardware stores, cookware stores, restaurant suppliers).
  —A food mill or some other type of ricer—be sure it hasn't got a sharp blade. (Again, see if you can find someone who's got one, or try hardware stores.)
  —A manual pencil sharpener with a desk clamp. Be sure the blades inside aren't sharp.
  —A manual-press juice squeezer.
  —A plant mister (bulb syringe or pump kind, available from florists shops or variety stores).
  —A hand drill with an attachable bit, hinges and screws, a variety of screwdrivers, and pieces of scrap wood.
- A plastic basket or box, to hold the parts of each machine.
- Crackers, for the food grinder or food mill; or commercial Play-Doh.
- Oranges or lemons for the juicer, and a plastic cup to catch the juice.
- Pencils, for sharpening.
- A small amount of water, another plastic cup, and food coloring, for the plant mister.
- Newspaper, to cover the table.

Time

Allow each group 30 minutes "tinkering time."

Getting Ready

Choose the machines you'll be using—from two to four, based on how many children and how much time you've got. Take the machines apart, putting all the parts in the box or basket, as you go. Cover the table, and put the machines and the things you'll be using with them, on it. Make sure to leave plenty of space around each machine. If you're alone, you should work with pairs of children, and if you have assistance, with a group of three or four.

Activity

1. Tell children they're going to be exploring how things work. Let them know they have as long as they need to figure out how the machine parts fit together, and that you'll help them. You may want to do a demonstration, using a machine different from the ones you've picked out for the activity.
2. Have two or three children work together on one machine at a time—it fosters cooperative learning. If they have trouble assembling it, ask questions to facilitate their thinking.
3. Once the machine's assembled, children can use it for its intended purpose: grinding crackers, spraying water, juicing lemons, etc.
4. Lead a brief discussion about ways we use machines in our lives.
5. As children take the machines apart, for cleaning and storing, go over the different parts. Relate the shapes to other familiar things: for instance, the spiral in the food grinder is like the spiral inside many kinds of shells.

Conceptual Background

By assembling or disassembling these uncomplicated machines, children will be getting a direct experience with technology that they may not have had before. The machines they'll be tinkering with are themselves made up of simple machines. A simple machine is something that changes the size or direction of a force, i.e., lever/fulcrum; gear/wheel; wheel/axle, inclined plane.

When children work with the plant mister they'll be using a lever, something they should be familiar with from riding on seesaws or using scissors. A lever allows a user to lift or move something with less force than would otherwise be needed. The fixed point that supports the bar of the lever is the fulcrum—on a seesaw, that would be the spot where the center of the seesaw rests.

The part of the lever between the fulcrum and the load the lever is lifting, is called the resistance arm. The part that lies between the fulcrum, and the end of the lever where lifting force is being applied, is the effort arm. (On a seesaw, the part between the bar where the center of the seesaw rests and the child being lifted into the air is the resistance arm. The part between the center bar and the child touching the ground is the effort arm.)

The pencil sharpener in this activity uses a gear wheel—a wheel with teeth around its edge, that meshes with another toothed wheel to increase the speed at which something rotates: in a pencil sharpener, gear wheels control the rotation of the grinders inside the sharpener. When two gear wheels are differently sized, the larger one turns more slowly than the smaller one.

In wheel and axle machines, like the food grinder, the drill, and again, the pencil sharpener, a wheel acts as a crank to transmit a rotary motion—a turning motion—to the axle, or rod, it's attached to.

An inclined plane provides a way to move a load using less force than would otherwise be needed for the same weight. The plane—a sloped surface, like a ramp, a stairs, or even a screw—increases the distance over which the applied force acts. Spreading out the force over a wider distance means less force is required to do the job. A screw is actually an inclined plane, wrapped around a cylinder.

Glossary

Axle: The rod on which a wheel turns.
Crank: A device to transmit rotary motion. It consists of a handle, or arm, attached at right angles to a shaft.
Effort: Force applied against inertia (lack of motion), or against resistance to motion.
Force: Power applied against an object, either pushing or pulling.
Fulcrum: The fixed point that supports a lever.
Gear wheel: A wheel with a toothed edge, that meshes with another gear wheel to alter something's rotation speed.
Inclined plane: A simple machine with a slanted surface, that decreases the amount of force needed to move a load.
Level: A device for establishing a horizontal line or plane by means of a bubble in liquid that moves to the center of a slightly bowed glass tube.
Lever: A simple machine, consisting of a bar supported by a fulcrum, that reduces the amount of force needed to move something.
Resistance: Opposition of a force or an object to another force or object.
Screw: Inclined plane wrapped around a cylinder.
Simple machine: A device that changes the direction or degree of a force.

Extensions

Wood Works

1 Gather hand drills with attachable bits (one drill can be shared by 2-3 parent/child pairs); pieces of scrap wood in uniform sizes (pine or other fairly soft wood works best for young children and is available free from most lumber yards); sets of hinges and matching screws (philips, slotted); a variety of screw drivers (philips and slotted in different sizes); baskets or boxes to hold the tools, rulers and pencils (optional). Note: Be sure the hand drill bit is the correct size for the screws.

2 Cover the table with several layers of newspaper (tape it down so it doesn't slip).

3 Go over the items in each basket (drill and bit; hinges, screws and screwdrivers). Ask children to tell you everything they know about each item and how it is used. If they don't know the names of things, you can supply them.

4 Let the groups experiment with drilling holes in the wood and screwing on the hinges. Some children might be ready to measure the exact distance between holes while others might need to use more of a trial and error approach.

5 Facilitate as the groups work. For example, if someone is having a problem screwing the bit into the drill, you might show them the way the end piece rotates so that the hole opens and closes, but don't screw the bit in for them. Let the groups experiment with drilling holes in the wood and screwing on the hinges.

Is It Level?

1 Gather a large amount of different-sized wood scraps and several carpenter's levels (see glossary).

2 Have children experiment with stacking wood scraps into two equal piles. Have them use the levels to make sure their stacks are equal.

3 Repeat the experiment with three piles, then four, etc.

4 Discuss how the level works. See how much the children can figure out about this simple device.

Tool Works

1 Gather thick and thin pieces of styrofoam packaging; different-sized screws and screwdrivers (philips and slotted); boxes to hold the screws and screwdrivers.

2 Let children select their styrofoam and a variety of screws and screwdrivers.

3 Let children experiment with screwing different screws into the styrofoam.

4 Some children might like to try screwing two pieces of styrofoam together. Help children estimate, then measure to see if the screw is long enough to go through two pieces of styrofoam.

Everywhere it's been tried, Playtime is Science™ has drawn great reviews form educators, parents, and most importantly-children! This innovative program lets parents and children have fun doing hands-on science activities using free or inexpensive materials. This Guide, which contains separate laminated activity cards, gives you everything you need to implement Playtime is Science™ in your school or community center.

What People Are Saying about Playtime Is Science™

I just wanted to let you know how much my children and I enjoyed Super Science Saturday. The building with junk, the use of tools, and the attempts to mix oil and water all spurred numerous questions about how things work. I think the parents had as much fun as the children.

A "Super Science Saturday" Parent

Thank you for your support and help with our early childhood science program. Thanks to you, we have had excellent science workshops for parents. We have learned a great deal about how children make sense of their experiences and how parents and children can share the joy of discovery. "Playtime is Science" is certainly true!

An Elementary School Principal
New York City Public Schools

My daughter participated in Playtime is Science, and next year went on to do really well in science. Before that she'd been so turned off to science-and now she's really engaged by it.

A Parent who became a
Playtime is Science teacher

Playtime is Science forges parents and their children into a scientific research team. Together they explore their world through a scientific lens. Science becomes exciting fun as parents and children work together as peers.

A Parent Association President

About the Authors

Barbara Sprung, **Linda Colon**, **Merle Froschi**, and **Sandra Jenoure** worked as a team to develop and pilot test the Playtime is Science™ parent/child activity program. Together, they bring years of experience in early childhood education, educational equity, science education, and parent involvement, as well as a personal commitment to equal opportunity for all children-regardless of sex, race, or disability.

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